Scientific American.

A JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, AGRICULTURE, CHEMISTRY, AND MANUFACTURES.

VOL. V.---NO. 13. NEW YORK, SEPTEMBER 28, 1861. NEW SERIES

Improvement in Sawmills.

It is usual, in sawing lumber, for the sawyer to have an attendant to assist him in moving the log forward after each board is sawed, in gigging back, &c.; but by the invention here illustrated, the service of the attendant is dispensed with, the gigging-back levers and rod for moving the saw being brought so near together that they may be operated by the sawyer without requiring him to move from his place. The boards, too, are all sawed of a uniform thickness, and the machine may be readily adjusted to saw boards of any thickness desired.

The log, A (see engraving), is fastened upon a rame, *b b*, placed upon the top of the carriage, and having a transverse motion across the carriage of a scope equal to the thickness of the log. Upon the under side of the frame, *b b*. are racks which mesh into pinions on the ends of the shaft, *c*, so that by turning this shaft the frame is moved sidewise, and the log is adjusted to the saw. The shaft, *c*, is turned by means of the lever, *d*, which carries a pawl catching into the ratchet wheel, *e*, upon the shaft; a rod, *f*, extending horizontally from the upper end of the lever, *d*, within reach of the hand of the workman.

The ratchet, *e*, is made in several sections with teeth at various distances, so that boards of any thickness desired may be sawed by placing the pawl to operate the corresponding section of the ratchet.

It will be seen that by this arrangement both ends of the log are moved up at the same instant, and its parallelism with itself is constantly preserved, thus making boards of an equal thickness throughout and all of the same thickness. In sawing thick plank the carriage is moved by two teeth of the ratchet for each plank, and in sawing joist the place of the log is adjusted to the scale, *g*.

In placing the log upon the carriage, the upright supports, *h h*, are placed to accommodate their position to any crooks in the log, or to its tapering form. These uprights are moved horizontally by pinions meshing in racks and worked with a ratchet and pawl; and one advantage of this arrangement is, that when the log is turned with its face to the uprights no care is required to make the last board of uniform thickness with the others.

The whole arrangement secures the most perfect work by even an inexperienced sawyer, and saves much time ordinarily wasted in fixing the log before sawing each board.

The patent for this practical improvement was procured through the Scientific American Patent Agency, July 9, 1861, and further information in relation to it may be obtained by addressing the inventor, Dennis Lane, at Plainfield, Vt.

The Strength of Iron Pillars.

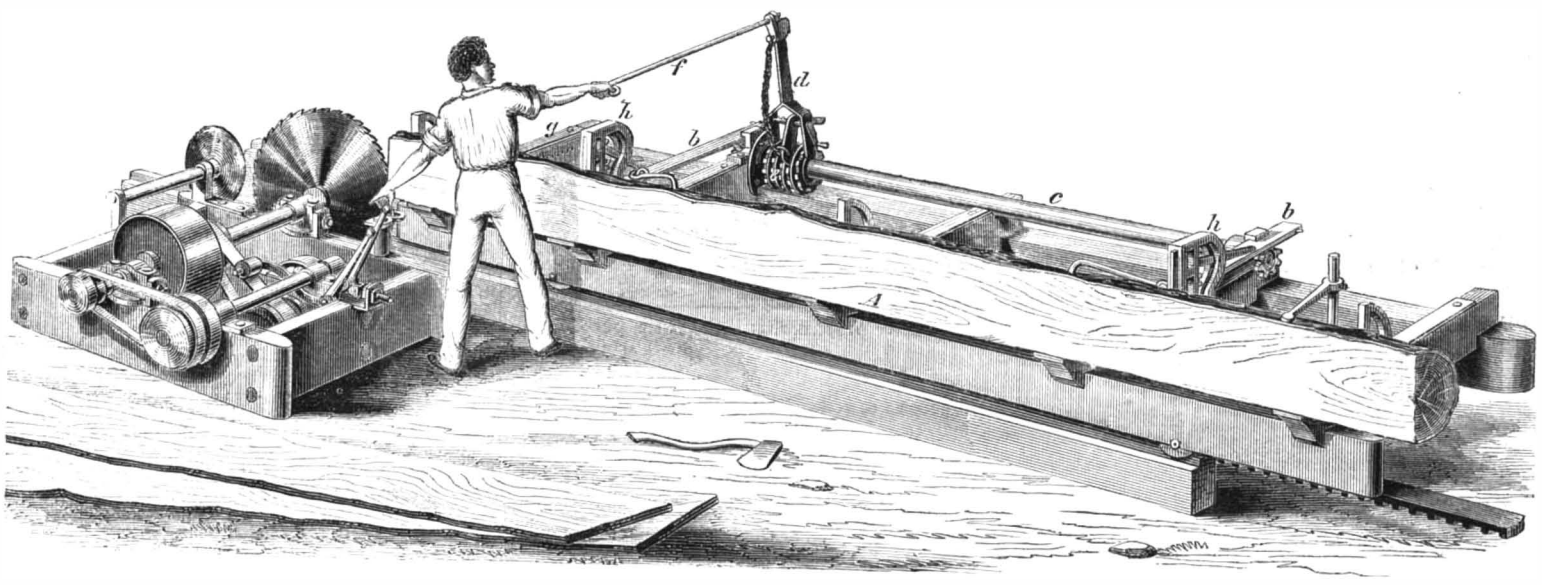
In an article on the above subject, by Wm. Bryson, C.E., published in the *Journal of the Franklin Institute* for this month, the author says :—"Mr. Hodgkinson found that the weight which would crush the pillars if they were very short would vary as 5 to 9 nearly; and for flexible pillars, he found the weight varied from 49.94 tuns in the strongest iron to 33.60 tuns in the weakest. Therefore, if we take the case of a hollow cylindrical pillar of 6 inches external diameter, beginning at ten diameters or 5 feet high, the coefficient of the strength will be 18.81 tuns; for 6 feet high, 20.88 tuns; for 7 feet high, 24.56 tuns; for 8 feet high, 27.84 tuns; and so on, increasing until we arrive at 44.34 tuns, or a trifle above 16 feet, or thirty-two diameters. And in the case of a solid pillar of the same hight, and 6 inches in diameter, the coefficient of the strength will be 22.69 tuns, increasing in a similar manner as the above until we arrive at 44.16 tuns, or about 12½ feet, or twenty-five diameters. * * * A hollow pillar 15 feet high and 6 inches external diameter, with a sectional thickness of 2 inches of metal, will support very nearly the same weight as a solid one of the same hight and 6 inches in diameter, with a saving in the weight of metal of 147.41 lbs.; that is, 1,179.37 lbs. will support, as a hollow cylinder, nearly as great a weight as a solid one containing 1,326.78 lbs. The safe weight of the former being 62.94; that of the latter, 63.98 tuns."

THE *London Engineer* expresses the opinion editorially, that steel made by the Bessemer process is the best material for large guns upon any and every principle of construction.

How to Handle Firearms Safely.

An old sportsman gives the following advice in reference to the safe handling of percussion guns :—

When the gun is charged, never allow the lock to be in any other state than at half cock, except at the moment before firing. The reasons why this rule should be adopted and religiously observed are briefly these: The lock is so constructed that when at half cock (provided it is good for anything, and no other should ever be used) it cannot be moved from that point toward the cap to explode it in any possible way. You may strike it violently, and it will not yield until the lock itself breaks in pieces. If, by any accident, it is moved in the opposite direction, it must go back until it is fully cocked, and must remain there until the trigger is touched. If it does not go back to that point, it cannot possibly, in returning, pass the point of its first position—that of half cock—unless the trigger is touched at the moment, which would seldom if ever happen.



LANE'S IMPROVEMENT IN SAWMILLS.

Many sportsmen are in the habit of carrying the gun "at the cock," even when in company with others, as well as when alone. Should a twig accidentally touch the trigger, should the sportsman stumble and fall, or strike a heavy blow with the breech against a tree, the gun explodes; it may be harmlessly, or perhaps at the expense of life or limb. Never cock the gun until the moment before firing. Again: others are under the erroneous impression that the safest way is to carry the hammer down upon the cap. The truth is, that is the most dangerous of all. When the hammer is pressed upon the cap, the jarring caused by the various movements in handling the gun is constantly bringing the percussion powder to such a state that a very slight tap upon the hammer will explode it. Now this is precisely the way in which almost all the accidents happen by which so many wounds are inflicted and lives lost by the sudden explosion of firearms.

I have endeavored to be as brief as possible, because I am aware that your columns are crowded; but I earnestly hope that the few hints above will be of service to those who are desirous of learning how to use the gun. It is a trite but nevertheless true saying, that "it is hard to cure old dogs of their tricks." Old sportsmen *will* follow their old habits, but to young sportsmen I would say, adopt the following short rules, and I will insure you as much safety as can be expected from the use of an instrument at all times dangerous :—

1. When the gun is not charged, always put the hammer down upon the nipple. It relieves the main spring, and preserves its strength.
2. When you load, bring the hammer to half cock, charge the gun, and let the putting on of the cap be the last operation. Press it down lightly with your fingers, and not by carrying the hammer down upon it.
3. Never cock the gun until the moment before firing.
4. In all cases, whether alone or in company, while hunting, keep the gun at half cock, and never, on any account, put the hammer down upon the cap.
5. It is better, on setting the gun aside, first to discharge it; but if you will or must leave it loaded, be sure to leave it at half cock, and with the cap plainly to be seen. If then it should be accidentally thrown down, it cannot be discharged.

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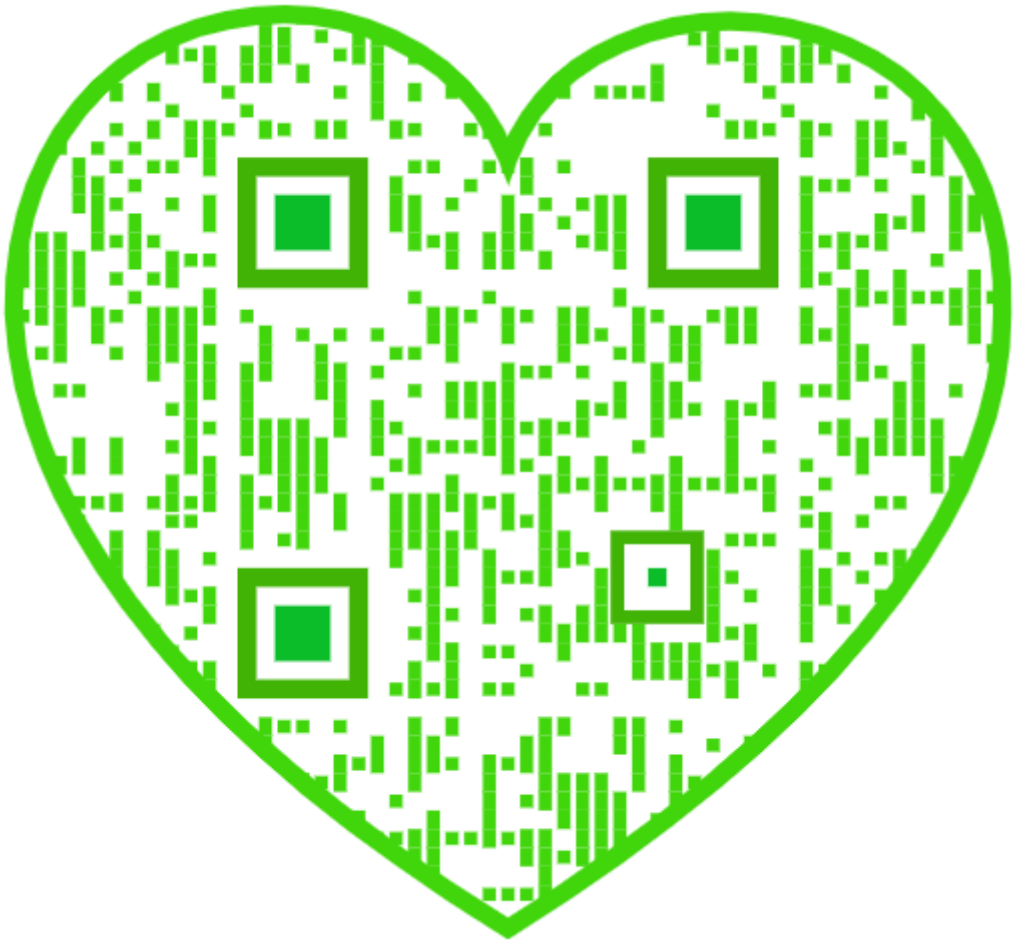

THE WAR.

ANOTHER FIGHT IN WESTERN VIRGINIA.

Our account of affairs in Western Virginia left General Cox chasing the secessionists under ex-Gov. Wise up the valley of the Gauley, a stream which enters the Kanawha from the east. General Floyd is cöoperating in concert with Governor Wise, and General Rosecrans, who has command of the U. S. forces in Western Virginia, started from Clarksburg in the Northwestern part of the state with four Ohio regiments to attack him. After a march of some 80 or 90 miles to the south, he came upon General Floyd's forces on the 10th of September, encamped and strongly entrenched on the north side of Gauley River, in front of Connifix Ferry, near Summersville.

The following is General Rosecrans's official report of the action that ensued.

HEADQUARTERS, ARMY OF VIRGINIA,
CAMP SCOTT, Sept. 11—P. M,

TO COLONEL E. D. TOWNSEND:—

We yesterday marched seventeen and a half miles, reached the enemy's entrenched position in front of Connifix Ferry, driving his advance outposts and pickets before us. We found him occupying a strongly entrenched position, covered by a forest too dense to admit its being seen at a distance of three hundred yards. His force was five regiments, besides the one driven in. He had probably sixteen pieces of artillery.

At three o'clock we began a strong reconnoissance, which proceeded to such length we were about to assault the position on the flank and front, when night coming on, and our troops being completely exhausted, I drew them out of the woods and posted them in the order of battle behind ridges immediately in front of the enemy's position, where they rested on their arms till morning.

Shortly after daylight a runaway "contraband" came in and reported that the enemy had crossed the Gauley during the night, by means of the ferry and a bridge which they had completed.

Colonel Ewing was ordered to take possession of the camp, which he did about seven o'clock, capturing a few prisoners, two stand of colors, a considerable quantity of arms with quartermaster's stores, messing and camp equippage.

The enemy have destroyed the bridge across the Gauley, which here rushes through a deep gorge, and our troops being still much fatigued and having no material for immediately repairing the bridge, it was thought prudent to encamp the troops, occupy the ferry and the captured camp, sending a few rifle cannon shots after the enemy to produce a moral effect.

Our loss will probably amount to twenty killed and one hundred wounded. The enemy's loss had not been ascertained, but from report it must have been considerable. H. S. ROSECRANS.

GENERAL FREMONT'S PROCLAMATION MODIFIED.

The President has written a letter to Gen. Fremont ordering him to modify his proclamation giving freedom to the slaves of the Missouri secessionists so that it will conform to the law of Congress. This law confiscates all slaves employed in military operations against the government; though it was interpreted by Secretary Cameron, in his letter to Gen. Butler, to apply to all slaves belonging to secessionists.

IMPORTANT EVENTS IN KENTUCKY.

Repeated and recent votes in Kentucky have shown that three-quarters of the inhabitants of that state are in favor of the Union; still the Governor, who is in full sympathy with the secessionists, is constantly plotting to get Kentucky out of the Union. A large body of secessionists having taken possession of Columbus, in the western part of the State, on the Mississippi, twenty miles below Cairo, the Legislature passed an act requiring the Governor to order them to leave, and on the Governor vetoing this act, the Legislature passed it by the requisite vote over his veto. He has accordingly issued his proclamation, very mildly requesting the troops to withdraw. While the act was under discussion, an attempt was made by the secession members of the Legislature to include an order for the Union forces, who are in Paducah, on the Ohio a short distance above Cairo, to withdraw also, but this proposition was voted down by a large majority.

VESSELS CAPTURED AT HATTERAS.

Several vessels which ran out of Hatteras Inlet while it was in possession of the secessionists, have been captured by our vessels on their return. They were allowed to cross the bar when they found themselves in the presence of our men-of-war, and under the guns of the forts.

THE FORCES AT WASHINGTON DRAWING NEAR EACH OTHER.

The secession army south of Washington is constantly approaching our lines, and a great and decisive battle may be anticipated at any moment. It will be decisive if our forces are victorious, as the defeat of the main secession army would break the backbone of the rebellion; but if the Union troops should chance to be defeated, it will prolong the war, for the loyal people of this country, North and South, will never permit the nation to be destroyed till they have exhausted their resources in the effort to save it.

Destruction of Lighthouses.

The keeper of the Cape Florida lighthouse has recently arrived in this city from the Cape, and reports that a band of secessionists, calling themselves "The Coast Guard," and commanded by Captain Arnow, from St. Augustine, arrived at Key Biscayne at 2 o'clock, A. M., of the 23d, in a boat from the main land. They at once took possession of the light-house and the dwelling, and all the government property and imprisoned the keeper. They first went up into the tower, and destroyed the lens (and a valuable second order Fresnel illuminating apparatus) and injured the machinery so badly that it cannot be used again. They reported that Jupiter light was put out by them on the 20th, and Cape Canaveral some days previous. The party left Cape Florida on the same morning, proceeding toward Miami in their own boat, and taking a boat belonging to the lighthouse department. On the 26th Captain Frow saw, while coming down to Key West in a dinkey, the same party moving down between the Keys and the main land, towards Carysfort light, and he believes that their object in going in that direction was to destroy the Iron light upon Carysfort reef. We have not heard from this light, and cannot tell whether they succeeded in their nefarious attempt.

MATTERS AT WASHINGTON.—For wise purposes all matters connected with the movement of troops and the strength and position of our army in and around Washington are veiled from public view, and the press considerately refrains from publishing anything that can in any way prejudice the cause of the government. It is enough for the people to know that a vast army is concentrated in and around Washington; that the organization and drill of the troops are going on with industry and care, and promise great effectiveness in any future operation that may be undertaken against the enemy. It is probable that the army now numbers, in the Eastern and Western divisions, some 300,000 men. 200,000 more at least are wanted at the earliest possible moment, and unless they are forthcoming as volunteer enlistments drafting will be resorted to. The government is bound to sustain itself at all hazards.

GRAND ARMY OF THE WEST.—On the 1st of September the army in command of Gen. Fremont, within a short distance of St. Louis, numbered some 60,000 men, well armed, equipped and drilled. Additional troops are constantly arriving from Iowa, Illinois, Indiana and Ohio, and new regiments are forming here, and it is probable there will be no less than 150,000 troops here, or hereabouts, comprising the "Grand Army of the West," before the cool days and cooler nights of October come.

THE largest army ever collected was that with which Xerxes, the king of Persia, invaded Greece in the year 580, before Christ. It is estimated to have numbered 2,500,000 soldiers, with as many more camp followers, making the whole host 5,000,000 human beings. They conquered Athens, but only a small remnant of the army ever returned to Persia. On his way to Greece Xerxes took twelve young girls of the country through which he was marching, and, from the promptings of some barbarian superstition, buried them all alive. "The whole expedition," says Abbott, "was the most gigantic crime against the rights and interests of mankind that human wickedness has ever been permitted to perpetrate."

MORE GUNBOATS LAUNCHED.

On Saturday, the 14th inst., the new gunboat *Chippewa* was launched from the yard of Webb & Bell, Greenpoint, L. I., and the *Winona* from the yard of Messrs. Pouillon, Brooklyn. The six new gunboats contracted for by builders in New York and its vicinity are now launched, and they will soon have their engines in and be ready for active service. One is now at the Navy Yard, Brooklyn, getting in her armament, stores and furnishings—her engines having been fitted up nearly three weeks since.

The gunboat being built at Baltimore, by Abraham of that city, is finished so far as to be ready for launching. She is 158 feet long; will carry twelve thirty-twos and one pivot gun. She is one of 22 gunboats being constructed for the government by contract.

A new sloop-of-war, called the *Housatonic*, will be launched at Boston on the 5th of October, and beside new war-craft building, about ninety vessels of various descriptions have been purchased by the Navy Department, some of which are already in service, but most of them are either at private or national navy yards undergoing repairs or receiving naval stores. Great activity is manifested at present in all the navy yards in preparing vessels for active service. Before the winter sets in we shall have several large fleets in commission. Most of the newly purchased vessels for the navy, which we have seen, appear to be schooners of the larger class. We have too few steamers and too many sailing vessels in the navy, but the new gunboats will remedy this defect to a large extent.

The New Gunboat Fleet.

The new gunboats, thirty in number, are now being built at the government navy yards and in private shipyards. They will all be ready for sea within two months. The following table shows the places where these boats are being constructed, with their tunnage armament:—

BUILDING AT NAVY YARDS.

Boats.	Yards.	Tuns.	Guns.
Kearsage,	Portsmouth, N. H.	1020	13
Ossipee,	Portsmouth, N. H.	1020	13
Housatonic,	Charlestown, Mass,	1020	13
Wachusett,	Charlestown, Mass.	1020	13
Juniata,	Philadelphia,	1020	13
Tuscarora, (launched)	Philadelphia,	1020	13
Adirondack,	New York,	1020	13
Oneida,	New York,	1020	13

BUILDING BY PRIVATE CONTRACT.

Boats.	State.	Boats.	State.
Aroostook,	Maine.	Unadilla,	N. Y.
Katahdin,	Maine.	Ottawa,	N. Y.
Penobscot,	Maine.	Pembina,	N. Y.
Kinso,	Maine.	Seneca,	N. Y.
Marblehead,	Mass.	Chippewa,	N. Y.
Segamore,	Mass.	Winona,	N. Y.
Chouro,	Mass.	Itasca,	Penn.
Huron,	Mass.	Scioto,	Penn.
Owasca,	Conn.	Wissahickon,	Penn.
Kenanhatt,	Conn.	Iahoma,	Del.
Cayuga,	Conn.	Pinola,	Md.

The armament of the gunboats being built by private contract has not yet been determined.

THE Springfield (Mass.) *Republican* states, that at the Hartford cartridge works about 70 persons, mostly girls, are now constantly employed in making cartridges. About 6 tuns of lead in bullets and two tuns of powder are made into cartridges weekly.

GENERAL WOOL.—In reading the history of the Mexican war, both in the cotemporary dispatches, and as afterward compiled by military historians—of all our commanders, the one whose conduct impressed us most as showing great Massena-like capacity, was General Wool.

WROUGHT iron in bridges and other like structures should never be subjected to a greater strain than one-fourth of its mean strength. The mean strength of the best American wrought iron is 65,000 lbs.; it should therefore never be subjected to more than 16,250 lbs. tensile strain.

AN EGG IN A BOTTLE.—To accomplish this seemingly incredible act requires the following preparation: You must take an egg and soak it in vinegar, and in process of time its shell will become quite soft, so that it may be extended lengthwise without breaking; then insert it into the neck of a small bottle, and on pouring cold water upon it, it will assume its former figure and hardness. This is really a curiosity, and baffles those who are not in the secret to find out how it is accomplished.

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THE POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The first regular weekly meeting of the Association after the summer recess, was held at its room at the Cooper Institute, this city, on Thursday evening, Sept. 12, 1861, President Mason in the chair.

THE AGE OF THE HUMAN RACE.

DR. STEVENS read a learned paper on this subject of which a brief extract will be found in another place.

STEEL.

The discussion of the regular subject, "Steel and its Uses," which had heen continued from the last meeting was then resumed.

MR. FISHER remarked that the introduction of steel as a material for steam boilers, had reduced their weight one-third; and this formed an important step toward the use of steam on common roads.

MR. DIBBEN objected to applying the term steel to the metal made at Troy, and all the other similar metals known as semi-steels. It is simply a high iron not entirely reduced. Cast iron is a combination of iron, carbon and nitrogen, and steel is the same with a smaller proportion of carbon and nitrogen. In the ordinary process of making steel, the carbon and nitrogen are first wholly removed from the iron, which is then buried in charcoal and kept very hot for a long time, the carbon of the charcoal, with nitrogen from the air or from some other source, combining with the iron and forming steel. Thus we first get the carbon all out of the iron, and then put a portion of it back. But in the Troy process, the reduction of the iron is suspended when it reaches the point to form steel. Bessemer first suspended his reduction of iron at the point to form steel, but that plan is now abandoned. He reduces his iron completely, and then supplies his carbon by mixing in cast iron which contains a known quantity of carbon. Bessemer's steel made by the first process is entirely out of favor with practical men. There was great want of uniformity in the quality.

It has been remarked here that iron will rust more readily than steel. This is a mistake. Every engineer knows that steel will rust more readily than iron.

MR. STETSON—By the old Lancaster process wrought iron in shavings was mixed with molten cast iron to give the proper proportion of carbon to the mass. It was necessary to introduce the wrought iron in small pieces or the cast iron will not—I will not say melt it—for wrought iron cannot be melted—but it will not eat it up. There is a great deal of mystery in regard to the relations of the carbon to the iron in the formation of steel. Mr. Zerah Colburn and I used to discuss the subject a great deal when he was in charge of the Ames Iron Works. Sometimes we came to the conclusion that the iron was arranged in fibers, and the carbon was filled in promiscuously between them, but I believe the facts always upset all our theories.

Mr. SMITH remarked that his experience was opposed to Mr. Dibben's in relation to the relative facility with which iron and steel would rust. He had observed that wrought iron would always rust more quickly than steel. Tools formed partly of iron and partly of steel, such as drills, &c., left in pits or other damp places, would always be found to rust more rapidly in the iron portion than in the steel.

President MASON remarked that this was in accordance with his observation.

SUBJECT FOR THE NEXT MEETING.

MR. TILLMAN—Mr. McAlpin, a very eminent engineer, who has had charge of the construction of the Harlem bridge, will, if invited, read a paper before this Association on the subject of bridge building. There are some matters, such as the use of hollow piles, that I have no doubt will be interesting to us.

MR. STETSON—I should like to hear our President on the subject of "The Influence of the War on Business."

It was finally decided to hear Mr. McAlpin's paper on bridge building if he was ready to read it; if not, to discuss the effect of the war on the mechanic arts; it being understood that the President would read a paper on that subject. As President Mason was formerly Professor of Political Economy in the University of New York, he is very competent to open the discussion on this subject.

The meetings of this association are held every Thursday evening at half-past seven o'clock at the Cooper Institute. All who take an interest are invited to attend.

The Age of the Human Race.

At the meeting of the Polytechnic Association of the American Institute, reported in another place, Dr. Stevens read a paper on the geologic period at which the human race was created, which was listened to with the greatest interest. The following is an abstract of the paper:—

The great truth that comes out with most prominence from the vast multitude of facts collected by geologists, is the creation of successive races and species of animals which have slowly succeeded each other through immense periods of time, constantly advancing from simpler to higher forms of organization.

Nearly all the rocks that compose the solid crust of our own globe were deposited at the bottom of seas and lakes, constituting formations ranging in geographical extent from a few rods to thousands of miles, and varying in thickness from a fraction of an inch to many thousand feet.

When we find one of these rocks deposited upon another, we cannot resist the conclusion that the upper rock has been deposited after the lower one, and thus the relative ages of the rocks are positively ascertained. Now, in the oldest rocks that contain organic remains, we find the lowest forms of life. For a very long period the only inhabitants of this earth were shellfish. The seas swarmed with them in immense multitudes; certain species lived, multiplied, and gradually became extinct; these were succeeded by others, and thus species followed species in long succession, their shells falling to the bottom of the ocean, and forming rocks which were miles in thickness. These rocks were afterward slowly raised above the level of the sea by those undulations which are constantly taking place in the crust of the earth, and as they were broken and turned up on their edges, we can now measure their thickness with a rod and line.

After the shellfish had existed alone for a period sufficient for these deposits to be made, fishes were created, and the next strata of rocks in the ascending scale are filled with shells and the bones of fishes mixed together. After the fishes came the reptiles, then the mammalia, and last of all man.

The evidences of man's existence in the geologic history of the earth are all confined to the immediate neighborhood of the surface, indicating his comparatively recent appearance, but discoveries made within two or three years carry back his origin to times far more remote than had before been supposed. These evidences are of two kinds: first, the bones of man; second, his works.

Among the works of man that are found buried in the earth by rocks which have been formed over them, are utensils of various kinds, for war, for cooking, &c.; excavations, the wounds inflicted by man in the bones of other animals; and buildings either isolated or in cities. The most famous of the buried cities that have been found is Pompeii, in Italy. This city, with its inhabitants in the full tide of life, was suddenly burried by ashes and mud thrown out from the volcano of Vesuvius in the year 79 of the Christian Era. So completely was it buried that it disappeared utterly from the face of the earth, and its place was lost to human memory. In the year 1713, some excavations led to the accidental discovery of its suburbs, and the whole city has since been exhumed. The skeleton of a sentinal was found at his post, and the skeleton of a miser with his bag of gold clutched in his hand. Buried cities have also been found in Scotland, California and other countries.

Until very recently, all the remains of man or of his works that had been discovered were above the drift formation. The drift is that mass of rounded boulders and gravel which covers most of the surface in this part of the world; a very fine specimen of it may be seen in Broadway, opposite the City Hospital. It was evidently not deposited, like the stratified rocks, at the bottom of the sea, and there is some doubt in regard to the mode of its formation, but geologists now generally suppose that it was brought down by ice from the cold polar regions. The melting of the ice seems so to have chilled the waters of the ocean in this vicinity so as to kill all the fishes that inhabited them.

Now, within a few years many discoveries have been made of human remains in the drift, either carrying back the age of the human race, or bringing forward the age of the drift. In South Carolina, two human skeletons have been found in a bog iron ore, almost wholly transformed into oxyd of iron. In California, stone chisels, arrow heads, mortars and pestles are found just above the placer formation—the formation that contains the gold. In many places in Europe human bones have been found in caves associated with great quantities of bones of extinct animals, the animals having been killed by the very savage men who lived in the caves and carried in to be eaten. Many of the animals found in regions now temperate are tropical animals, such as the hippopotamus, rhinoceros, &c., and this evidence, with that furnished by the plants, shows that the temperature of some portions of the earth was at one time much higher than it is at present.

The discoveries of human remains in the drift prove, as I have said, either that the drift is newer or that mankind is older than had been supposed. Which of these is the case cannot yet be determined, but the present indications are that it will carry back the origin of man to earlier geologic periods. All the new evidence, however, coincides with the old in proving that man was the latest as he is the highest of the creations of God.

Curiosities of Genius Relating to Inventions.

In a description of the new building for the next Exhibiton of Industry, the London *Times* contains the following somewhat amusing but probably true account of the applicants for space as exhibitors. It says:—

It must be taken, we suppose, as a proof of the versatility of genius that we always find the professions and trades of these intractable inventors have not the remotest connection with their valuable mechanical, chymical and warlike discoveries. Thus a clergyman may send breech-loaders and tremendously-destructive shells, while the nurseryman and market gardener proffers improvements in surgical instrument, and the doctor a contrivance for forwarding the ripening of fruit on walls. One grocer demands space for the exhibition of a new axle applicable to all carriages, a new projectile for ordnance, and a new method of propelling ships. An M. A. and F. R. G. S. has models of an invulnerable floating battery, a breech-loading gun and carriage converting all guns of old pattern into breech-loaders, a refuge buoy, a beacon, a cork poncho mattress, a life, limb, and treasure preserver, an unfoulable anchor, and some new screw propellers. An accountant asks space for a model of a self-acting water-closet, with water, meter, and apparatus for regulating the flow of water all in one, the model of an improved theodolite, and omnitonic flute, all to be shown together! A bookseller seems overflowing with invention. He has a plan of interminable suspension applicable to bridges, aqueducts, &c., of great span or length and by which he means to do away with the costly supports hitherto used; a target-shooting protector for the safety of those employed to note the score; a new paddlewheel, by which to secure a greater amount of power than is attainable by any other arrangement; a self-acting railway signal for day and night, and bolts for gates at level crossings, whereby to prevent the gates from being opened while a train is within a quarter of a mile or any convenient distance; a safety spring mining cage to secure the safe lodging, or prevent the falling of the cage in its ascent or descent, when conveying men or goods up or down the mine shaft, should the rope or chain break or become disarranged; a new window-sash fastening and door-bolt, by which to attain perfect security, from the impossibility of unfastening them from the outside. A barrister wishes to exhibit two architectural designs; a pair of spring-heeled boots, and a drawing of a man equipped with ditto; diagrams of Coryton's system of fairway lighting off the coasts of Great Britain; a type-composing machine and hand stamp; models and drawings illustrative of Coryton's atmospheric guide propeller, and Coryton's self-adjusting sails. An insurance-broker has specimens of wines and other fluids fined by a new and more effective process, and model of the apparatus used; electric telegraph cables and conductors; model of an improved ship, and of parts thereof; specimens of improved pavement in carriage roads; specimens of improvements in iron houses, &c.: specimens of building stone preserved by a new material; model of a machine for dressing stone; specimens of improved junctions of iron pipes to prevent breakage; specimens of a new description of embroidery: ditto of paper-hangings; ditto of an improved floorcloth. These likewise are all to be shown together.

IN London, on the 28th ult., telegraphic communication was commenced with the station at Taganrog, on the sea of Azoff. This telegraph line is twenty-five hundred miles long, and the experiment was quite successful, the clerks at each end conversing with each other upon the state of the weather. This is the longest telegraph line in the world.

IN the French military service, during the Crimean war, where chloroform was given to tens of thousands of wounded, the rational and safe rules were promulgated never to wait for total insensibility, as bullets, balls and fragments of shells are best extracted in the second steps of chlorform inhalations. This stage may be always insured by diluting the chloroform.

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Classification of Articles at the World's Fair—Trades—Medals.

At the "World's Fair," held in London in 1851, the classification of articles was stupidly ridiculous. They were arranged by such divisions as "Animal Substances used in Manufactures," "Vegetable and Mineral ditto." This arrangement was productive of endless confusion and no little dissatisfaction as well. The arbitrary distinctions of animal, vegetable, and mineral of course upset all exhibitions of trades as trades. Thus, in 1851, an undertaker sent two highly finished coffins, one of wood and one of lead. The wooden one went into the class of vegetable substances used in manufactures, and the leaden one to the mineral class. In the same way, an exhibitor had a handsome collection of elaborate fancy snuff-boxes separated through many classes, according as the boxes were horn, wood, metal, &c. Some articles, such as trunks, dressing cases, and so on, which were made of wood, leather, and metal, all united, were of such a composite character that they could not be classed under any of the great divisions, and for these and other things of the same kind, a miscellaneous class was formed, which, as might be expected under such circumstances, soon grew to one of the largest and most interesting in the building. The great divisions of animal, mineral, and vegetable classes are still, to a certain extent, to be followed next year, but within these are sub-classes in which all the trades will be exhibited as trades. To facilitate this classification, a trades' list has been compiled from the trades' lists of all the principal towns in Great Britain, and it is stated to be a most extraordinary catalogue, taking the information which has been obtained in compiling it into consideration. Thus, for instance, the Commissioners have found that to make a complete English watch, the cöoperation of no less than forty-six distinct trades are necessary, each of which only makes certain special component parts of the works or case. These trades have their own rules and apprentices, and are as perfectly distinct from each other as the trades of tailors aed shoemakers. It is the intention of the Commissioners to have these trades appear as distinct but harmonious exhibitors.

It has been decided that there is to be a medal awarded to each of the best exhibitors in the various classes and sub-classes. This will be a plain bronze Council medal, somewhat similar to that of 1851. There will be no other award than this. The juries to distribute these medals will be formed as follows: There will, in all be nearly 100 classes and sub-classes. Every sub-class having more than five exhibitors will be entitled to claim a jury of three persons for awarding medals. Each exhibitor will have a right to name a juryman, and out of the names so returned the Royal Commissioners will select three whose decision will be final. No juryman can award himself a medal in his own class, but, of course, any one selected as a juryman can decline the office on the ground that he prefers competing for the medal. Foreigners will be allowed to choose a foreign jury, and the number of medals to be awarded to each class and sub-class will, of course, be limited, though the limit has not yet been determined on.

American Steamer in Australia.—There was launched at Port Adelaide, on the 22d June, a new steamer called the *Settler*, on the American principle of propelling by a large stern wheel. The vessel was taken by her captain and engineer, who are the owners, from Fraser River, British Columbia, in pieces; her timber is beautiful, free from knots, and fine in grain. The *Settler* is for the Murray River and its tributaries, where a profitable trade exists for vessels of her class. Her dimensions are:—length of keel, 145 feet; overall, 172 feet; breadth, 36 feet; depth, 5 feet; above the level of deck she has two stories, the lowermost for cargo and the uppermost for passenger accommodation. Her engines are of 80-horse power; diameter of stern wheel, 16 feet by 22 feet broad.

New Cartridges for Breech Loaders.—C. Reeves, of London, has recently obtained a patent for making cartridges for breech-loading rifles of card paper, having a slit in the base of each covered with tissue paper. When the percussion cap is snapped on the nipple of the rifle its flash bursts through the tissue paper and ignites the charge, while the thick part of the cartridge prevents leakage at the breech.

Stamped Envelopes.

THEIR MANUFACTURE IN THIS CITY.

The manufacture of stamped envelopes, like that of postage stamps, as explained in the *Evening Post* a few days since, has recently undergone important changes. The stamps are produced from dies of handsomer design and execution, and more convenient envelopes are taking the place of those formerly in use. The blending of colors is a feature which adds materially to their beauty, and the many facilities at the command of one of the most extensive printing houses in the world are employed in their production. A further improvement will be made by the addition, to all those issued after the 1st of October, of "dissolving lines," or in other words, the self-ruling principle, an invention of the manufacturers of the stamped envelopes, George F. Nesbit & Co., 165 Pearl and 79 Pine streets in this city.

The processes of manufacturing and printing the envelopes, apparently simple, are very interesting. The work is performed almost entirely by machinery of a most complicated description, which has been perfected after years of careful study and experiments by the manufacturers of the stamped envelopes, and is in use.

The first operation in the production of envelopes is the cutting of the paper into the required shapes. About four hundred sheets of large size are cut through easily and quickly by a sharp instrument, whose edge of peculiar shape describes the outline of the paper which is to form the envelope. This is done by the application of a lever in the manner of ordinary hand-press printing. Two hundred and seventy thousand envelopes can be cut by one person in a single day.

The only portion of the work which is performed exclusively by hand is the gumming of the fold of the envelope, which constitutes it "self-sealing." This is done by girls previous to the stamping and ruling. The cut sheets are laid upon each other, with the proper portion of the surface of each exposed, and the gum is applied by hand. They are then carefully dried.

A WONDERFUL MACHINE.

The final process, embodying all the operations necessary to the completion of the finished, stamped and ruled envelope, is the work of a single machine. A pile of the sheets are placed at one end of the machine and taken up singly by steel fingers, and conveyed by tapes along an iron platform. On the way each sheet receives upon the upper surface the impress of the die, and at the same instant the dissolving lines from below, without apparent detention. Arriving at the other end of the machine an iron bar, having an end shaped like the folded envelope, falls perpendicularly upon the sheet. As it is about to be driven into an aperture of similar shape, the gum, which is held in a little reservoir, is applied with such rapidity as to defy accurate observation. The folding is then instantaneously, and we may add, mysteriously completed, the adhesion of the parts is perfected, and the envelope passes out between rollers, which press it into a long and odd-looking receptacle, which, when twenty-five have entered it, makes a semi-revolution, thus causing the next twenty-five to lie cross wise, and so on until it is filled. No hand labor of any description is required in the running or management of the machines (of which several are employed). A girl sits by the side of each, leaving her place only when it is necessary to carry away the finished envelopes or bring a new pile of paper. It is worthy of remark here that the machine refuses to work at the instant when the supply becomes exhausted, or even if by accident the fingers should fail to take up a sheet, or by design one were withdrawn.

THE STAMPS.

The dies from which the stamps are printed are of steel, and the figures, letters and portraits are sunken. The printing is performed in the ordinary letter-press style. Therefore, the characters upon the stamps stand in relief, and the heads especially are brought out with great boldness and beauty.

The one cent stamp is in shape an oval, nearly plain, bearing a bust of Franklin in profile, and the words, "One cent—U. S. Postage," with a star on either side. It is printed in a dark blue.

The three cent stamp is a handsome design. It is slightly oval, and contains a profile bust of Washington, with the words in very neat outline letters, "United States—Three cents," and a figure "3" in a circle on either side. It is printed in a deep rose-pink.

The four cent stamp—or rather a one and a three printed upon a single envelope—is designed for the prepayment of carrier's fees, with the regular postage.

The six cent, or double letter stamp, is printed upon a law-sized envelope, and is a counterpart of three cent denomination, except that the figures representing the value are changed.

The ten cent stamp is a combination of two ovals, one inside the other, the inner one bearing the head of Washington. Around it are printed the words "Ten cents—U. S. Postage." The outer oval is slightly ornamented, and extends over the other horizontally. The figures "10" on either side, in circles covering both ovals, complete the design. This stamp is printed in green.

The twelve cent stamp is of similar design to that of the ten cent. It is printed in red and gray, and only upon law-sized envelopes.

The twenty cent stamp, representing the California double rate, is of the same design, and is printed in red and blue.

The twenty-four cent stamp is also of the same general design. It is printed on law-sized envelopes, and in green and red.

The forty cent stamp—the quadruple California rate—is of the double oval design, on law-sized envelopes, and printed in black and red.

No stamped envelopes of higher denomination have been ordered by the Post Office Department.

In addition to these a stamp has been printed for the California Pony Express. Across the left end are well shaded outline letters, printed in red, "Wells, Fargo & Co.," and through and over these the words "One-half ounce, paid from St. Joseph to Placerville, per Pony Express," and also the following as a superscription, "Agent of Pony Express, St. Joseph, Mo. For ——." The stamp is printed in green.

There are also two styles of stamped paper—note and letter sizes—which contain only the three cent stamp. They are designed as a combination of the letter with the envelope, and fold as such—for the purpose of having the full evidence of the genuineness of a letter, including the postmark, accompanying it.

The three cent stamp is printed on two sizes of envelopes—letter and note—and is, with some of the other denominations, used upon both white and buff paper. Sixteen styles of stamped envelopes in all are manufactured.

Packages of those envelopes are made up according to order from the department, the manufacturers holding themselves in readiness to supply any demand, from one to one hundred thousand.

THE EFFECT OF THE WAR.

In order to show the effect which the war, with the loss on account of the seceded states, has had on the sales of stamped envelopes, the following figures are given:—

Envelopes furnished to the department for the quarter ending June 30, 1860	7,147,950
Envelopes furnished to the department for the quarter ending June 30, 1861	5,033,850
Decrease	2,114,100

STAMPS AND STAMPED ENVELOPES.

The number of stamped envelopes as compared with the number of ordinary stamps used annually has been comparatively small. Yet there are various reasons for believing that in the future stamped envelopes will come to be much more generally used than has hitherto been the case. It is becoming evident that these envelopes may, by means of the improved machinery in use, and as a consequence of the vast number manufactured, be produced cheaper than the ordinary ones, when the stamp is considered as an additional item. Besides the self-ruling principle is patented, and the manufacturers of the government envelopes are entitled to use it. It is an improvement, and will be more and more appreciated as such.

A Strong Hint from Old Times.—M. Paravey in a report made by him to the French Academy of Science in 1840 says, that it is mentioned in the books of the Chinese that in 618, B. C., during the Faing-Off dynasty, they used a cannon bearing the inscription, "I hurl death to the traitor and extermination to the rebel."

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Sulphate of Copper as a Preservative of Wood.

Kœnig has investigated the chemical reactions which occur when wood is impregnated with a preservative solution of blue vitriol. He finds as a general rule, that a certain quantity of basic sulphate of copper remains combined in the pores of the wood in such a manner that it cannot be washed out with water. The copper salt may be seen by its green color in the spaces between the yearly rings in the less compact portions of the wood, that is to say, in those portions which contain the sap. Those varieties of wood which contain the most resin retain the largest amount of the copper salt,—oak, for example, retaining but little of it. The ligneous fiber itself appears to have little or nothing to do with the fluxation of the copper salt, and indeed none whatever is retained in chemical combination, so that it cannot be washed out with water, by pure cellulose. When wood, from which all resin has been extracted by boiling alcohol, is impregnated with sulphate of copper, it does not become colored like the original resinous wood, and the copper salt contained in it may readily be washed out with water. In like manner, from impregnated resinous wood all the copper salt may be removed, with the resin, by means of alcohol.

The constituents of the blue vitriol are consequently fixed in the wood by means of the resin which this contains.

Further it is found that the impregnated wood contains less nitrogen than that which is unimpregnated and that it is even possible to remove all the nitrogenous components of the wood by long-continued treatment with the solution of sulphate of copper. The nitrogenous matters being soluble in an excess of this solution just as the precipitate which forms when aqueous solutions of albumen and sulphate of copper are mixed is soluble in excess of the latter. Since the nitrogenous matters are well known to be promoters of putrefaction, their removal readily accounts for the increased durability of the impregnated wood.

The utility of blue vitriol as a preservative may also depend in a measure upon the resinous copper salt which is formed, by which the pores of the wood are more or less filled up and the ligneous fiber covered so that contact with the air is prevented and the attacks of insects hindered. It is suggested that those cases in which the anticipated benefits have not been realized in practice by impregnating wood with a solution of blue vitriol, may probably be referred to the use of an insufficient amount of this agent, *i. e.*, where the wood was not immersed in the solution for a sufficient length of time. The action should be one of lixiviation, not merely of absorption.

A New Anæsthetic.

During the past few months, says the *American Journal of Science and Arts*, considerable interest has been excited among members of the medical profession by an attempt to introduce into practice a volatile liquid possessing anæsthetic properties, which is obtained as an incidental product in the manufacture of coal oil. Of the chemical history of this substance, called keroselene by its manufacturers, but little is as yet known. Professor Bacon, of the Harvard Medical School, informs us "that a sample in his possession is of sp. gr. 0·640, at 72° Fah. When heated in a flask containing scraps of platinum foil it began to boil at about 85° Fah. As the more volatile parts distilled off, the temperature continued to rise, and at 170° about three-quarters of the liquid had evaporated. It continued to boil feebly, but the whole was not converted into vapor until the thermometer had risen considerably above 300°; and when the flask was allowed to cool, much of the vapor condensed before the temperature had fallen to 300°. It is evident that several, perhaps many, hydrocarbons are present, having a wide range of boiling points. Probably, the most volatile of them would be gaseous at ordinary temperatures, if isolated. It is remarkable that the keroselene should be so readily and completely volatile at atmospheric temperatures. I found that keroselene and Squibb's ether, exposed in watch glasses, lost equal weights in 2½ and 3½ minutes respectively; and the former evaporated completely in about two-thirds of the time required for the ether. The specimen which I examined contained a little sulphur. Some sulphur compound was therefore present as an impurity, which would be decidedly objectionable for anæsthetic purposes."

The vapor of this substance possesses very decided anæsthetic properties. This was first accidentally noticed by its effects upon a laborer engaged in cleaning a cistern at a coal-oil manufactory, and afterward proved by the workmen by experiments upon flies and mice. Whether it can be employed without danger as a substitute for ether or chloroform is as yet undecided. Dr. H. J. Bigelow, in the *Boston Medical and Surgical Journal*, reports several cases in which its exhibition was attended with unfavorable symptoms; and at the present time the general feeling of medical men in Boston with regard to its value is evidently much less favorable than when it was first brought forward. It may be remarked that the "keroselene" in question is exceedingly well purified as far as relates to its odor, being almost entirely free from the objectionable smell which characterizes most of the light coal oils.

UNITED STATES CIRCUIT COURT—IN EQUITY

Infringement of Patent—Bank Note Companies in Court.

Tappan, Carpenter & Company agt. *The National Bank Note Company and others*—SHIPMAN, D. J.—This is a motion for a preliminary injunction to restrain the respondents from using a machine, or machines, for perforating paper, alleged to be the invention of George C. Howard, and for which he holds a patent. The complainants allege that after the issuing of the patent to Howard (May 21, 1861), he assigned to them the exclusive right to use the invention for one year. It is not stated in the bill where the year began to run, nor is the date of the assignment given. But I assume the year commenced on the day of the date of the patent.

From the allegations of this bill, and the affidavits filed in the cause, I must, in deciding this motion, assume the following facts:—

1. That the machine patented was invented by Howard, more than four years before he applied for a patent.

2. That for a valuable consideration to the patentee, and for the profit of the complainants, the former permitted the latter to use one or more of the machines for more than two years before any application was made for a patent.

3. That at the instance of the complainants the patentee permitted the American Bank Note Company to construct one or more of these machines, and use them in their business; precisely how long, or upon what consideration, does not appear.

4. That only one month and ten days, or, at the longest, about two months elapsed, during which exclusive possession of the invention secured by the patent could have been enjoyed either by the patentee or the complainants.

Without touching upon the question of abandonment, if I were called to decide upon this motion, upon the ground that the patentee had forfeited his right to a patent, under the seventh section of the act of 1837, I should, as the case now stands, be compelled to deny the relief. I could not resist the conclusion that the use of the machines by the complainants, with the consent of the patentee, for a period of more than two years before the application for a patent, in the absence of any evidence that a single step was taken to secure one, or that either the inventor or the complainants ever intended to secure one, that the patentee had forfeited his right. It would be difficult, on the present evidence, to hold that the use was not a public one. And if it was a public use, then the patentee, by permitting such use for more than two years before he made any application for a patent, forfeited all right to one, and his patent is void. This I understand to be the doctrine laid down in McCormick *agt.* Seymour (2 Blatch. 254). In that case, Mr. Justice Allson remarked, in construeing the seventh section of the act of 1839, that if a patentee "either sells a machine, or uses one, or puts one into public use two years before his application for a patent, it works a forfeiture of his right."

But I do not wish to prejudge this point of forfeiture in the present case, nor the other of abandonment. Courts should be very tender of the rights of inventors, and not draw hasty conclusions adverse to the validity of their rights secured by patent. I am, therefore, disposed to decide this motion on another ground, and one which will throw no doubt on the validity of this patent, although it is difficult to see how it can be saved on the conceded facts. I will therefore assume, for the purposes of this decision, that there was no public use of this invention prior to the application for a patent—no forfeiture of the patentee's rights by a use of more than two years, and no abandonment and dedication to the public. I will assume that whatever use there was was secret, and under such circumstances that the right to a patent was not lost.

But after these assumptions, it is equally clear that I can grant no preliminary injunction. This extraordinary relief is never granted as matter of course. It is never granted on filing a bill and producing a patent. The patent itself, although in a certain sense is *prima facie* evidence of the validity of the grant, is never sufficiently strong *per se* to warrant the relief asked for in this motion. The title of the patentee must, in order to obtain this relief, always be strengthened by exclusive possession for some period of time, or by an adjudication in which the validity of the patent has been sustained. This patent never having been litigated, of course no judgment has ever been pronounced in its favor.

The right could not have been in the exclusive enjoyment of any one for more than one month and ten days, or at farthest about two months, as the application was made on the 23d of April and the patent was granted on the 21st of May, 1861, and before the 1st of July the respondents asserted their right to use the machine, and insisted that the patent was void. The principle that exclusive possession for a time strengthens the title of a patentee, is founded on the idea that, as it is a claim of right adverse to the public, and the public acquiesce in that claim, such acquiescence raises a presumption that the claim is good. But no such presumption can be raised in this case. There is no evidence that the public, or that small portion of them which would be likely to avail themselves of this invention, knew even of its existence, much less of the existence of an exclusive grant to this patentee or to any one else.

Nor in this view of the case can I take into account the possession of the right, and the use of the invention, *before* the application or the grant of the patent. This is sometimes done on the principle laid down in Sargeant *agt.* Seagreave, 2 Curtis C. C. R., 555. But, of course, the use in such a case must be a *public* use, under an avowed claim of a right to a patent; otherwise there is no exclusive possession as *against* the public, and no claim in which the public can acquiesce. In this case, I must assume the use prior to the application to have been secret, or the patent is clearly void. This unavoidably places the complainant, so far as this motion is concerned, between Scylla and Charybdis. To hold that the use prior to the application was a public use, and was exclusive as against the public, would, as it extended beyond two years, wreck the patent. To hold that it was a secret use, away from the eye of the public, sweeps away the ground of exclusive possession, and acquiescence of the public, and leaves no foundation upon which the motion can stand. But the latter result is least prejudical to the patent. The motion is, therefore, denied. As these questions of forfeiture and abandonment are peculiarly within the province of the jury, I think unless the answer, when filed, should change the aspect of the case, that they should be passed upon by a jury before an injunction is asked for.

Improvement in Hanging Propeller Screws.

A good improvement has recently been patented in England by A. Chricton, of Cork, Ireland, for arranging and fitting the shafts of propellers. He connects the last or outer length of shaft with a joint or coupling in the manner of a hinge, so that when the knuckles or faces of the joints stand vertically, the shaft having the screw upon it may be raised from the horizontal to a vertical position. The stuffing box upon the screw shaft is in advance of, or forward of, the joint or coupling, as is also the thrust block. Suitable bearings are provided for the movable length of screw-shaft to rest in when at work, and top brasses or bearings are provided capable of being moved or withdrawn horizontally or vertically when the screw and its shaft have to be raised or withdrawn. The last piece of propeller shaft need only be of a length sufficient to enable the point of the lower blade of the screw to come within the line of the inner stern post, when the shaft is vertical and the screw horizontal; but the screw shaft may be turned up to an extent less or more than 90° from its original plane of rotation, for the purpose of accommodating any feature in the internal arrangement of the stern of the ship. For the purpose of enabling the screw-shaft to be raised, also for the purpose of allowing the screw propeller to be raised and moved inward by describing a quadrant or any lesser or greater portion of a circle, Mr. Chricton divides the inner stern post, from the boss upward, into two parts or thicknesses, leaving the requisite space between them; and he forms a box or hollow space immediately above the narrower part of such opening, for the purpose of receiving the screw. Where it is desirable to provide for the removal or renewal of the propeller, or its adjustment, examination, or repair, it is only necessary to continue this water-tight or boxed space up to any convenient hight above the deep load water line, to enable ready access to be afforded to the screw and its shaft. Power is applied to the screw shaft for the purpose of raising it or moving it in the manner described, either by means of a rack and pinion gearing, or ordinary block and fall tackle, or any other well known mechanical means may be employed for giving the requisite amount of motion, and for securing the propeller when raised.

THE locomotive *Reindeer*, on the Naugatuck Railroad, having a set of Krupps's cast-steel tires, had run 7,740 miles up to the first of August last without any perceptible wear, while their adhesion upon the rails was equal to that of wrought iron tires. The time is not far distant, we believe, when the tires of all driving wheels will be made of steel; also the faces of the rails on the track. This will secure far greater durability in rails and engine wheels.

BENZOLE AS A SUBSTITUTE FOR TURPENTINE.—As turpentine has become scarce and nigh in price, owing to the supplies from North Carolina being cut off, the naphthaline oil obtained in the distillation of the petroleum of the oil wells in Pennsylvania, has been tried as a substitute in painting and found to answer well. It is now used in place of turpentine in the car works at Pittsburgh, Penn. This is a new application in the arts, and a wider field has been opened for the sale of coal-oil products.

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Correspondence

Fire Alarm Telegraph.

Messrs. Editors :—For more than a year a system of telegraphing alarms of fire has been used in Providence, which it may interest the people of ordinary sized cities to have a description of. So far as I know it is more efficient than any other plan used for notifying firemen of the location of fires, except the almost perfect, but rather expensive telegraph, used in Boston and several other large places. That your readers may understand the system I advocate for small cities, let me describe briefly that now existing in Providence.

A single line of No. 8 galvanized wire, starting from an engine house at one extreme of the city, passes over, and is frequently insulated upon the house tops, until it reaches an engine house at the other extreme of said city, the line being about 4¼ miles long, and having at each end a "sulphate of copper" battery of 30 cups The circuit embraces all the engine houses, the police office, chief engineer's office, the room of the night watch, and several stores whose proprietors agree for a salary to ring, whenever required, certain church bells in their neighborhood. In each of the places referred to, is a box containing a relay magnet, clock-gong, hammer and a key for operating—in all 17 boxes.

No operator is maintained in constant attendance upon this telegraph, for, as the electric current is kept upon the line always, any person understanding the fire signals can give a proper alarm at any of the boxes by simply pressing the "key" the requisite number of times. At each pressure upon the said key the current is interrupted, and a simultaneous report of operations in the box used is made upon the "gongs" in all the other boxes by their respective hammers. Generally, within two or three minutes after the signal is thus given, the church bells used for alarming the firemen are in motion and striking the number of the district in which the fire may be, notwithstanding the ringers have no other information respecting the cause of the alarm than they have obtained by telegraph. Bells two miles apart often commence alarming at the same moment.

One of the most important features of this plan is its cheapness. The entire line in Providence was put up for less than $750, and is maintained in connection with the salaries of the church bell ringers for about $500 per annum. C.

Providence, Sept. 10, 1861.

Cooling a Room by Electricity.

Messrs. Editors :—Becoming convinced in my own mind that electricity is the principal cause that acts in producing changes of temperature, I constructed a very powerful electrical machine to demonstrate tangibly the truth of the theory. With this instrument in a room heated to 90° I caused the thermometer to fall 12° in five minutes, or just in proportion to the amount of electricity thrown into circulation. Is the discovery or rather experiment new to science? The experiment was tried in the winter of 1859.

M. K.

Tracy, Ill., Sept. 5, 1861.

Messrs. Munn & Co.:—Will you please inform me by early mail where in your city I could purchase saber bayonets. Reply soon, and very much oblige.

W. A. Patrick.

Ludlow, Vt., Sept. 13, 1861.

Who will answer our correspondent?

We are constantly having inquiries at this office for military stores. Dealers would promote their interests by advertising their wares in these columns. All articles in the military way, from rifled cannon to a pair of spurs, are subjects of general inquiry from persons in all the loyal States.

Ancient Inventions.—Our readers will recollect that in No. 5 of the present volume we published an illustration of a breach-loading cannon which was brought from China, showing considerable antiquity as to the time of its construction. Those ancients were a curious set of cunning contrivers, and we know not how many modern inventions may not have been familiar to them, but lost in obscurity only to be reinvented by us.

The Ohio State Fair.

Messrs. Editors :—Not knowing that you will have any direct report of the Exhibition of the Ohio State Board of Agriculture at Dayton this week, I volunteer a few remarks for the Scientific American. It is generally known that most state societies have thought best to postpone their annual fairs this year on account of our financial and political difficulties; but as a whole pecuniarly, the Dayton fair has been a success. Power Hall, in so far as variety of engineering novelties are concerned, was a failure. A good, substantial 15-horse portable engine, with an excellent circular saw-mill attached, a machine for cutting shingles with novel feed works, and a scroll saw, constituted the main features of this department. A "model steam engine, professing to save one hundred per cent," by working the steam twice, once in a 1-inch cylinder and then again in a 2-inch cylinder. This little thing was so fascinating that I moved out of the way, leaving the award to be meted to the skillful inventors by the crowd, who were better able to understand its novelty and merits.

In the Department of Agricultural Implements and Machinery, tools of all descriptions and of the finest finish were exhibited in profusion. Agriculture in its varied phases is the ground-work of all national prosperity, whether in arts, manufactures or commerce, and I feel proud of our country as I look upon the success of invention in this department.

Aside from the implements adopted in Europe from inventions strictly American, I am confident that we can, by the perfection of our agricultural tools, cultivate the earth with one half the manual labor required in any other country. To speak of their excellence would but require me to name the various manufacturers there represented from Indianapolis, Cincinnati, Dayton, Springfield, Cleveland, Buffalo and Hoosic Falls, but I shall only notice one novelty in the reaping machine. Walter A. Wood & Co., the well-known builders of reapers and mowers at Hoosic Falls, N. Y., have this season introduced a new self-raker attachment to their machine which, in my judgment, will be generally adopted. It is not my business to advertise any man's wares, and I would not in this instance allude personally to any particular machine but from the fact that I have recently seen the operations of this one, and am fully assured that I shall not wrong the public by thus calling their attention to it.

In cattle, horses, hogs and sheep the exhibition was splendid. In plants, flowers and fine arts there was ample to demonstrate that there is increasing improvement in taste for farm products and domestic manufactures.

The soul-stirring speeches of Mr. Carter and Mr. Maynard, exiled patriots from Tennessee, made at the exhibition, were replete with patriotism. Ten thousand persons stood around these veterans in the cause of liberty and right, and alternately cheered and shouted as they denounced secession and scorched the *peace traitors* in our midst.

One excellent feature of this fair was the cheerful order of the crowd. To meet 30,000 persons on the limits of a fair ground, each anxious to see and learn all they can of the exhibition in a day, and yet all good natured and smiling, does give one hope for ultimate triumph of good, and makes one forget for a time that rampant war pervades a large district of our beloved country, and that the interests of civilization have been carried backward by rebellion during the last eight months. Joseph E. Holmes.

Dayton, Ohio, September, 1861.

Voice from an Exile Patriot.

Messrs. Munn & Co :—*My Dear Sirs* :—Having made my escape from the tunnel of secession, I feel that I am once more, thank kind heaven! where the light of union and friendship prevails. I want you to forward your paper of papers to Louisville, Ky., where I have removed, bag and baggage. I do not know whether you have continued to send it or not to my former residence; but be that as it may, I have not received it or the *Herald* since they were stopped by Cottendom.

I feel as though I had been on the great gulf of ruin, shipwrecked for a long time, and now just got foot on shore, or perhaps as a sinner born again. Language fails to describe my feelings, especially when my wife is in equal ecstacies, as well as several negroes, who seem entirely devoted to us. I expect to be a perpetual subscriber to your paper, and would to Heaven that every one could get into its spirit, then there would be but little discord throughout the world.

Although I was born and raised in Georgia I never had any Southern, Northern, Eastern or Western feelings. I was taught to be proud that I was an American citizen, and am so still, and so long as I am in my senses, will continue to be, and I pity the man who is not.

With the highest respect I remain, yours truly,

A. W. T.

Louisville, Ky., Sept. 14, 1861.

A Curious Question for Philosophers.

Messrs. Editors :—That electricity will produce light, heat, chemical affinity and magnetism, that each of these forces will produce all the others, and will effect mechanical work—and finally that gravitation will produce them all—we know because we see it done. The reciprocal relations—or the correlation of the physical forces are simply observed phenomena.

It is regarded as self-evident that no force can be created or annihilated in the universe. If heat, for instance, is produced, it must always continue as heat, unless it is converted into electricity, chemical affinity, or some other of the forces of nature, or into mechanical effect. The quantity of heat required to produce any given mechanical effect has in fact been measured, and it is found that sufficient heat to raise the temperature of one pound of water one degree, will lift 772 pounds of matter one foot in hight. On the other hand, the destruction of motion will produce heat. If a hammer is brought down upon a bar of iron, the hammer and bar are heated, by the destruction of motion in the hammer. It is held that mechanical power must always produce its equivalent of some of the natural forces, and that none of these can be extinguished except in the production of one of the others, or of mechanical effect. The conservation of force is understood to be a self-evident truth.

Now, the greatest mechanical power with which we are acquainted is the power of the tides. It surpasses the power of all the steam engines in the world, the water power of all the rivers and the muscular power of all the animals on the earth combined. By means of tide mills a portion of this power may be utilized and converted into electricity, heat, &c., which, according to the law of the conservation of forces must continue in some form forever.

The question is, "How is it that this is not new force created in the universe? What power is consumed or destroyed in the production of the tides? The tides are produced by the alternate action of the earth's and moon's gravitation, and will not this gravitation go on producing this great mechanical power without any exhaustion or diminution through all coming time?" It is presumed that the phenomena of the tides may be reconciled with the law of the conservation of force; but by what process of reasoning? B. G.

New York, Sept. 15th, 1861.

Opinions About Learning to Shoot—The Position A correspondent asserts that twenty years' experience and observation have taught him that any person may become a good shot by observing the following directions :—Allow the rifle to hang in the hands in an easy manner declined at an angle of about forty degrees; then raise it steadily up quickly in a line with the object, the eye ranging carefully over the sights, and at the instant the object aimed at is covered touch the trigger. He says :

I find that there is a moment in which the gun is absolutely still—that is the instant the upward movement of it is arrested. These directions observed will certainly make a good shot. If the sight is lost at the first trial it can be recovered by a second. Any deviation from this rule is fatal to accuracy.

Army Supplies.—Hon. George A. Shaw, Inspector General of Army Supplies made in New England, says that there are twenty mills now engaged in manufacturing cloth for the government, and that the amount of goods ordered is valued at $20,000,000.

The German Diet has ordered 520 rifled cannon to be manufactured for mounting in the federal fortresses.

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Indigo Blue—Woad.

Blue has always been a favorite color for army and navy cloth. The great demand for cloth of this color at the present time has had a wonderful effect upon the prices of indigo, the best qualities of Bengal and Guatemala having advanced about fifty cents per pound within two months. Blue or woolen cloth is dyed with woad and indigo in vats. All fine blue cloth is colored with these dye drugs, but a great deal of flannel and inferior cloth is colored blue with the ferro-cyanide of potash. This blue color is easily affected, and fades with solar light and exposure to the weather. Indigo and woad applied with alkaline solutions in vats produce fast colors, and no others are suitable for soldiers who are continually exposed to the weather.

The quantity of indigo in our market is very limited at present, and the import will be very small for a year to come, at least. The indigo crop was very light last year in Guatemala, and it was the same in India, owing to disturbances with the ryots in the indigo districts.

Woad for coloring blue in the pastil vat was more extensively in use some years since than it is at present; its cultivation has therefore greatly decreased of late years. The high prices of indigo may induce our farmers to enter upon its cultivation, as it produces a very fast and beautiful color on wool.

The New York Canals.

The revenues of the canals of this State, which for several years were declining under the competition of the railroads, and which fell below the interest on the canal debt, so that it was necessary to raise a portion of the interest by taxation, are now very rapidly increasing, and are more than sufficient to pay the interest on the debt.

The whole amount of tolls received on the canals during the fiscal year ending on the 30th of September, 1861, is estimated at $3,366,822.

The following comparative statement shows the gross receipts of tolls for the past three years :—

1859	$1,814,363
1860	3,381,301
1861	3,366,822

The Fastest Shooter Yet.

Mr. Thompson, a German, has brought to our office a musket with a barrel six feet long, and without any lock, which is designed to receive forty charges at the same time, to be fired in succession one after another, by fuses running through the bullets. A fuse extends from the upper charge to the muzzle, and when the soldier is ready to commence his fire, he lights his fuse, and then has nothing further to do than to aim his piece at one enemy after another, the gun keeping up the fire till the whole forty charges are exhausted. The time between the discharges is regulated at will in the construction of the fuses which pass through the bullets, and experience has shown that about two seconds is the proper time to permit a careful aim to be taken. Thus, thirty shots may be fired in a minute, all with accurate aim.

The cartridges may be arranged in strings of five, ten, twenty or forty, as shall be found expedient, and may all be driven into the gun by a single motion, where they will lie ready to be poured forth in a constant stream of death.

The gun, with its stock, is about eight feet in length, and with a bayonet on the end it would form an excellent weapon against cavalry. So plausible can this invention be made to appear, but will it be found to be practicable?

A Bridge to Build.—By reference to an advertisement in another column it will be seen that an advertiser wants to contract for a bridge 300 feet in length, to be set upon piles. It is a good chance for an energetic and experienced bridge-builder to get a job in war times.

M. Oudry, a French engineer, proposes to build a bridge across the Straits of Messena, upon the principle of a horizontal swinging tube of iron. Such a bridge, formed of two tubes, each 250 feet long, he has already thrown across an arm of the sea at Brest.

A floating steam fire engine on the river Thames, has been in use for six years. It has india rubber valves, which have not been renewed since it was built. At the late great fire in London, this engine worked without stopping for fourteen days.

A Corps Formed by General Fremont for Signalizing at Night.

Professor E. P. Howland, of Battle Creek, Mich., calling on us for some information in regard to the purchase of telegraph wires, informs us that he has received an appointment from Gen. Fremont to organize a corps of fifty men for the purpose of transmitting intelligence and orders at night by means of the lime light. He has selected his men, and is now in the city for the purpose of procuring his apparatus.

By establishing his light at headquarters, orders may be instantly transmitted to the commanders of detached corps at any distance not exceeding thirty or forty miles, without the danger of having the communication interrupted by the cutting of the wires. Information, too, may be sent from any point to any other where the signals can be seen by means of a telescope.

The signals will consist in successive occultations of the light, either the Morse alphabet or some similar one being employed. The light will be placed in a box with a round hole in front, covered by a light sliding gate, which may be operated with the finger by means of a lever. By pressing down the end of the lever, the gate is drawn over the hole, and the light is shut off. By successive opening and closing of the hole, flashes of light may be emitted of greater or less length, corresponding to the dots and lines of the Morse alphabet, or any other that may be adopted, and in this way the desired words may be transmitted.

Weights and Measures.

At the Congress of Social Science recently held in Dublin, M. Chevalier, the distinguished French writer on political economy, gave a short history of the efforts which have been made to introduce a universal system of weights and measures into all countries. In 1790 the centessimal system was adopted in France, and it is now used in France, Spain, Portugal, Greece, Belgium, Italy, the Netherlands and in three of the republics in South America. M. Chevalier considers the French system as the best for all nations. Professor Hennesey stated that the great object was to hit upon a measure that would meet the wants of the world at large. The *metre* and its divisions appeared most suitable, for the metre is a fraction of the meridian of the earth. He had heard a great deal said against the metre because it was a French system, but if it were the best it should be adopted and become cosmopolitan. The Social Congress passed a resolution recommending the adoption of a uniform and general system of weights and measures.

The London "Times" and United States Stocks.

It is well known that the London *Times* is owned and controlled by the Rothschilds, and this fact sufficiently accounts for the course of that paper in relation to United States stocks. It is easy to see that 7 per cent bonds of a nation as rich and as honorable as this—the only nation that ever paid its national debt—a nation whose wealth and productive power is surpassed by one alone—must command a premium among capitalists seeking safe and profitable investments. If the Rothschilds can manage to run down the stocks so that they can buy several millions of the bonds at a low price, they will make sure of a very handsome speculation by the rise which is certain to take place.

India Cotton.—By the Bombay *Commercial Gazette* of July 12, it appears that 75,000 bales of cotton were shipped for Europe in three weeks ending July 10, and that twenty-two ships were then loading for Europe at the low rate of 7s. 6d. per bale, or less than half a cent per pound. The shipments from Bombay to England have been: For first five months of 1861, 537,631 bales; for first five months of 1860, 270,165 bales. In June and July the rate of shipment was increasing, and would average at least 112,000 bales per month. In October the new crop would begin to arrive, and if the present rate of shipment continues, the export to England for the present year will exceed 1,300,000 bales

Spain has 27 paddle-wheel frigates carrying 130 guns; also six screw frigates, and thirty-three screw corvettes and gun-boats. There are at present being structed in the Spanish dockyards ten screw frigates two of them—the *Numancia* and the *Tetuan*—to be iron-cased.

SHOCKING ACCIDENT FROM DRESSES TAKING FIRE—SAFETY CLOTHING.

On the night of the 14th inst., a lamentable accident took place at the Continental Theater, in Walnut street, Philadelphia, by which fourteen ballet girls were severely burned, and six of them have since died in excruciating agony.

The accident occurred while the girls were dressing for the ballet, and while one of four sisters named Gale was taking down her dress, it was brought in contact with the gaslight, and almost in an instant it was in a blaze. Her sisters then rushed up to extinguish the fire, and their dresses too were ignited. The fire mounted to their arms and breasts, inflicting terrible burns. Panic-stricken, they ran from the room, through a narrow passage way, into the next dressing room, filled with ballet ladies. The gauze dresses of these blazed up directly, and screaming, struggling, wrestling, the poor creatures either turned and leaped from the windows into the street, or ran hither and thither calling for assistance.

The scene in the theater was terrific and heart-rending. One of a similar character took place in France before the court in Paris, about four centuries ago, when several of the younger sons of noble families were burned while performing a masquerade. But we need not go back to other centuries to hunt up such terrible accidents; they are by no means uncommon. It has frequently happened in this and other cities that the dresses of ballet girls have caught fire from the foot lights, causing death in the most terrible and excruciating form.

With such a knowledge of practical chemistry as has been acquired by every reader of the Scientific American, all such accidents can be prevented. In noticing the lamented death of the wife of Professor Longfellow, on page 55 of our current volume, we described the following method of preparing ladies' inflammable dresses to render them safe against such accidents.

The chemicals to be used are the tungstate of soda and the sulphate of ammonia. The stannate of soda, the carbonate of magnesia and common alum will answer, but the first two are said to be the best. One part of these salts dissolved in ten parts of water is about the strength of solution required. The salt may be mixed with the starch, or after the dresses are starched and dried in the atmosphere, they may be thoroughly and uniformly moistened with it, then dried and ironed. In several of the great bleaching works in Great Britain, the muslin in pieces is now rendered uninflammable by the application of these chemicals.

We again urge this subject upon the attention of the public, and we solicit our readers to use their influence in disseminating such humane and useful information.

The Boston *Commercial Bulletin* thus describes Capt. Morris's method of correcting the compasses of steamers:—"Without any knowledge of the scientific nomenclature of magnetism, he assumed that it might be dealt with as a liquid; that is, turned aside from the vicinity of the compass, so that the latter should be left free to the action of polar attraction alone. By frequent and careful experiments, he discovered that local magnetism could be arrested outside of a certain circle by magnets, and that inside of this circle the compass would be influenced only by polar attraction."

M. Le Verrier has lately written a letter to Marshal Vaillant on the present theories of the solar system. He concludes that there are three rings of matter revolving round the Sun; one between the Sun and Mercury; the second near the Earth, including meteoric stones and shooting stars; and the third between Mars and Jupiter, consisting of small planets. The ring of asteroids between the Sun and Mercury has a total mass about equal to that of Mercury. The ring which supplies our aerolites and shooting stars has a total mass of not more than a tenth part that of the Earth. The total mass of the small planets between Mars and Jupiter is greater than one-third that of the Earth.

Sulphuric acid mixed with alcohol, and submitted to gentle heat, forms ether. Gun cotton steeped in ether and alcohol dissolves and becomes that useful article, collodion, which is now so valuable to the photographic artist.

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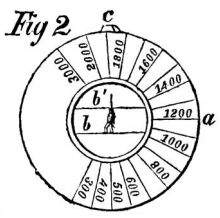
Diastimeter for Military Use.

[Translated from the Swiss Polytechnic Journal.]

Since firearms of every description have been much improved of late, as regards their accuracy and the distance to which they carry, it is indispensable to have some device for measuring or determining distance with accuracy and dispatch. Among the large number of devices for this purpose we have not seen one which is equal to that of Mr. Goldschmid of Zurich, as regards simplicity of construction and accuracy coupled with an easy and quick manipulation. Furthermore this device can be attached to any telescope without difficulty.

It consist of a cylindrical dial or case, *a*, (see the engravings) which is inserted behind the eye-glass of the telescope, being made to revolve round its axis. In the interior of the telescope tube the threads, b b′, are secured parallel to each other, the thread, *b*, being made fast and the thread, *b′*, movable. The motion of the thread, *b′*, is effected by turning the dial, *a*, and the threads always remain parallel. By turning the dial in one direction the threads separate, and by turning in the opposite direction they are drawn more nearly together.

Fig 2.



Distances are determined in the following manner:—The fast thread, *b*, is brought to coincide with the sole of a soldier's foot in the distance, and the thread, *b′*, is now moved until it strikes the upper edge of the hat of the man (see Fig. 2); the mean hight of a man with his hat on being assumed to be six feet. The index, *c*, shows now on the face of the dial the distance from the observer to the observed object in yards or feet, as may be desired.

For cavalry, where the observation is taken from the foot of the horse to the top of the rider's hat and where the mean hight is assumed to be nine feet, a separate scale is made on the cylindrical surface of the dial, *a*.

According to the size and quality of the telescope, the scale runs from 400 to 2,000 yards. During the observation the index, *c*, is held up on the top of the dial.

It is important that the observer shall place the threads in the proper distance of sight according to his eye, said distance being variable for far-sighted and for short-sighted persons. For this purpose the telescope is brought to bear on a dark object and the eye-tube, *d*, is shifted until said object is seen perfectly clear. If the threads are in the correct position for the eye they can be seen perfectly plain on the dark object. If this is not the case, the set screw, *e*, is unscrewed and moved in a longitudinal direction until the thread appear perfectly clear, when it is screwed, and never disturbed as long as the telescope is used by the same person.

This instrument has been in use with the Swiss artillery for more than a year, and it is conceded to be superior to all the instruments heretofore used for the same purpose.

Sheldon's Improvement in Melodeons.

The invention here illustrated consists in arranging a movable key board for melodeons so combined with the reeds that, by the aid of a fixed scale, it may be set to play in different keys.

Fig. 2 is a plan view of a melodeon with the improvement attached, having its cover removed to expose the key board. Fig. 1 is a longitudinal, and Fig. 3 a transverse section. Similar letters of reference indicate corresponding parts in the several figures. H is the case of the instrument, I I is the key board composed of a number of playing keys representing a complete octave, more than is represented by the reeds, J J, or other equivalent devices for producing the musical sounds. These playing keys are attached to a horizontal sliding frame, K, which enables them to be moved horizontally in a direction parallel with the front of the key board. The opening, *a a*, of the case, where the key board is exposed for playing, is of such length as to expose only a number of the playing keys, equal to the number of the reeds, J J, or their equivalents. L L is a set of levers, one for every reed, each arranged permanently over its respective reed, to operate by a push-down pin, b, (see Fig. 3) each of said levers having a protuberance, *c*, to be acted upon by corresponding protuberances, *d d*, on the under sides of the playing keys.

M is a horizontal screw made with journals, *i i*, to fit in fixed bearings, *e e*, in the lower part of the case, the journals being so shouldered as so prevent any longitudinal movement of the said screw. N is a nut fitted to the screw, M, and secured rigidly to the sliding frame, K. One end, *f*, of the screw is made square so that it may be turned by a key inserted into a hole in the end of the case. By turning the screw the nut is made to move horizontally upon it, and the frame, R, and key board are moved lengthwise with the instrument; the screw holds the key board in any position. The length of the screw is sufficient to enable the key board to be moved the entire length of an octave.

Fig. 1.

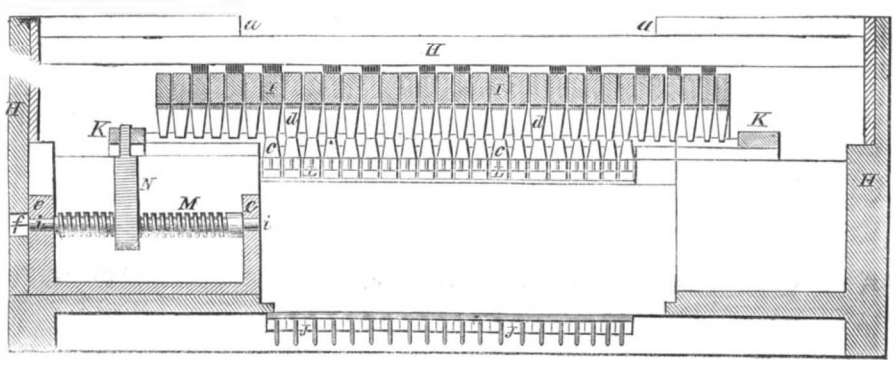
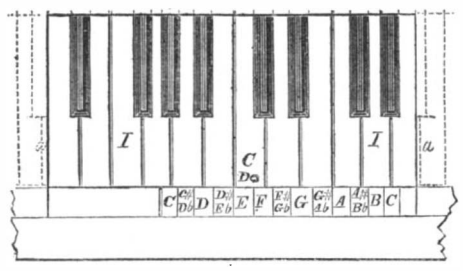
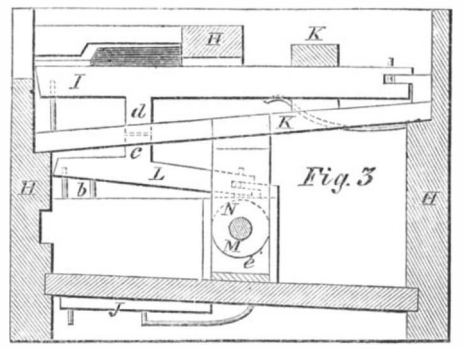


Fig. 2.

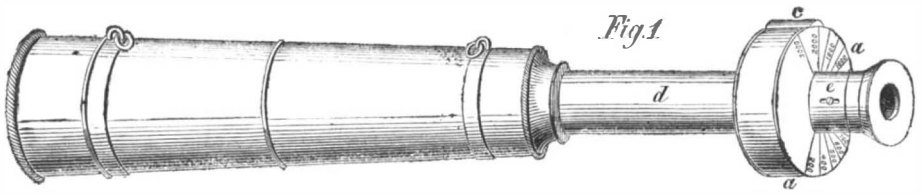


The fixed scale is shown in Fig. 2, lettered C C♯ D D D♯ E♭, &c., corresponding with the denominations of the notes of a complete octave, the several equal spaces on the scale corresponding in width with the widths of the spaces occupied by the back parts of the keys and by the levers, L L, and being severally opposite to levers which act upon reeds representing the notes with which the spaces of the fixed scale are marked. One of the C playing keys is marked C or D♭; and when this key is opposite the C space, the key board is in position for playing in the natural key. By moving the key board to bring the marked playing key opposite to any other of the spaces of the fixed scale, the playing will be performed in that key; and in all positions of the key board, while the playing keys range with the spaces of the fixed scale, the proper order of the semi-tones is preserved.

Fig. 3.



The patent for this invention was procured through the Scientific American Patent Agency, June 25, 1861, and further information in relation to it may be obtained by addressing the inventor, William F. Sheldon, at East Mendon, N. Y.



GOLDSCHMID'S DIASTIMETER FOR ARMY USE.

SHELDON'S SLIDING KEYBOARD MELODEON.

The Sun's Autobiography.

An English photographer —a greater than Joshua— has set the sun to writing his own history. Mr. Godard, of Wilton, has invented an apparatus by which a pencil of the sun's rays is directed upon a sheet of sensitized paper, and as the sun makes his daily journey, the varying effect of his light on the paper is recorded by varying depths of shade. It is proposed to have this record kept through the year, and through a series of years, and thus compel the sun to tell us in his own handwriting whether he preserves undiminished the fires of his youth, or is fading away in a gradual decline.

Asphaltum Oil.

At Milwall, London, there are the extensive works of a company, which has several estates in Cuba from which asphaltum has been obtained and sent over to England for the purpose of distillation to obtain paraffine and oil used for lubricating machinery. Heretofore the crude asphaltum has been shipped to England, but the company are about to establish works in Cuba, for distilling it upon the spot and sending over the crude oil. This will save a great expense heretofore incurred for transport, as all the refuse in distillation will hereafter be saved in the freight.

Considerable quantities of American petroleum oil, obtained from the Pennsylvania oil wells, have recently been shipped to England, where it will enter into competition with the native oil made from coal. We have been informed that the American rectified petroleum oil is superior to the English in every essential quality for domestic use, and that it can be furnished at lower prices.

Preparation of Surfaces for Electroplating.

A patent has lately been taken out in England by B. Piffard, of London, for preparing the surfaces of non-conducting substances to receive the deposition of metal by the electroplating process, as follows: He first washes the surface with a solution of nitrate of silver, in such a manner that a film of the solution adheres to the whole surface. It is now thoroughly dried, and afterward exposed to a current of sulphureted hydrogen gas, which reduces the silver in the nitrate solution to a metallic state upon the surface, thus rendering it capable of conducting electricity and receiving a plating of silver by putting it in a bath of the cyanide of silver, and connecting it with a Smee's battery. In this manner, articles of wood, porcelain, horn, india-rubber &c., may be silverplated. If the surface of the article will not at first retain a solution of nitrate of silver, it should be washed with a thin solution of gum arabic. This method of preparing surfaces for electro-plating may be useful for many articles, and may be employed as a substitute for the use of black lead and metallic powders which are now used.

Gen. Lyons bequeathed all his property, some $30,000, to the government. His labor, his possessions, and his life, have all been laid upon the altar of the country which he loved.

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Scientific American

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY
At No. 37 Park-row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.
Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
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VOL. V. NO. 12.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, SEPTEMBER 21, 1861.

INFORMATION AS TO THE PATENTABLE NOVELTY OF INVENTIONS.

The list of claims published from week to week in these columns, indicate truthfully the extent of business being transacted at the Patent Office.

It will be observed that inventors are far from being dormant, if they are not as numerous and active, as they were a year ago. Since the first of July we have received a great accession to the subscription list of this journal, and for the information of each, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and who contemplate securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. Having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a drawing and description or a model of the invention should accompany the remittance. Address—

MUNN & Co., No. 37 Park-row, New York.

OUR WORKSHOPS TURNING OUT ARTILLERY.

For a few weeks past we have observed that the establishment of S. B. Althause & Sons, corner of Greene and Houston streets, in this city, was brilliantly lighted in the evening, and the rattle of hammers showed that some work was being urged forward with great energy. Passing the place on the 13th inst., we observed workmen putting together gun carriages, and on inquiring at the office, we learned that the firm had just turned out the carriages for ten batteries of four guns each, and are making carriages for fifteen guns more. Each battery requires ten carriages, four for the guns, four caissons for the ammunition, one battery wagon and one forge wagon, the last having a complete set of blacksmith's tools, bellows, anvil, vise, hammers, files, &c.

The carriages are all made after the regulation pattern from working drawings furnished by the War Department from Washington, and Mr. Althause says that the inspecting officers are very strict in holding the contractors to rigid compliance with the specifications. The carriages are for 6-pounder guns, and will, of course, receive any gun of this size, though it is understood that they are to be mounted with the Parrott rifled gun, the invention of R. B. Parrott, Esq., proprietor of the Cold Spring Foundry, opposite West Point. It is formed of cast iron, with a stout wrought-iron hoop or reinforce around the breech.

Since the award of the contract, Messrs. Althause and Sons have been running their works night and day, and have turned out the hundred carriages for the ten batteries in thirty days. We understand that several other large establishments in the country are also at work in making artillery, and there is a good prospect that, at the next important battle, the secessionists will not be stronger than we are in cannon.

We expressed the opinion in the beginning that arms could be manufactured in our own workshops more quickly than they could be brought from Europe, and nothing yet done by General McClellan is more calculated to raise our opinion of his sagacity than his calling upon the great industrial resources of the nation to furnish his army with an ample supply of artillery. The result shows that we can manufacture cannon far more quickly than we can procure them from Europe.

IMPROVEMENTS IN ENGINES—SUPERHEATING STEAM.

The application of heat to steam after it leaves the boiler to enter the cylinder of an engine, is called *superheating*. During the past five years this principle of treating and using steam has been adopted on many steamships, and it has been stated that a saving of about one million of dollars per annum has been effected by the use of superheating apparatus on the vessels of the Peninsula and Oriental Steam Navigation Company, England. If this immense saving has been effected by one company, proportional results of a like character can be obtained by similar arrangements on every steam engine, whether used on sea or land. We would reasonably expect that the great railway interests everywhere would be beneficially subserved by the application of superheating devices to locomotives. On some of our American railway engines the cylinders have been placed in the smoke box to prevent condensation of steam by the refrigerating action of the atmosphere. This arrangement also secured partial superheating, but it has been condemned on account of throttling the draft of the boiler. A principal of engineering such as superheating steam may be perfectly sound, and yet owing to defective devices in applying it no useful result may be realized therefrom. Such seems to have been the case with cylinders placed in the smoke box of engines.

Experiment alone can determine the good or evil of any principle when applied to machinery. When a good principle fails by one arrangement it should never be condemned, but rather lead to such efforts as shall secure its success by other arrangements and other devices. The steam engine has been brought to its present state of perfection by persistent efforts, amid numberless failures, and yet it is well known that not one-third of the power due to the complete combustion of the fuel consumed is obtained on any engine that has yet been constructed. Here, then, there is still an expansive field open for experiment and invention to render this venerable and most useful motor a perfect machine.

The superheating of steam appears to be a forward step toward perfecting the engine, as its economy on steamships has lately been equally realized on locomotives, thus showing the principle to be good in itself and insuring beneficial results when properly applied. The Toronto (C. W.) *Leader* states that the locomotive superintendent of the western section of the Grand Trunk Railway has applied superheating apparatus (illustrated on page 129, Vol. IV, present series, of the SCIENTIFIC AMERICAN) to several passenger and freight engines, and on comparing their performances with engines of the same class not provided with superheaters, they have effected a saving of from 25 to 30 per cent in fuel. The *Leader* states that an examination of the working returns of nearly a score of engines, running on the Grand Trund Railway, shows that in no instance has the superheater failed to improve the engine in hauling power and steaming qualities.

WHITE GUNPOWDER.

There is an article upon the above subject by M. Pohl, a German chemist, in the London, Edinburgh and Dublin *Philosophical Magazine* for July last, and another on the same subject in the *Chemical News*, Aug. 24th, by F. Hudson, Esq. Considerable attention has lately been given by some chemists to this peculiar substance. The former states that prussiate of potash 20 parts, sugar 23 and chlorate of potash 49 parts, make good white gunpowder. In exploding this powder, 100 parts of it yielded 47·44 of gaseous products and 52·56 solid residue. Ordinarily black gunpowder furnishes only 31·38 of gaseous products and 68·06 of solid residue. The efficiency of gunpowder is measured by the gases which are produced from it by explosion. An equal weight of white gunpowder will produce 1·67 times the explosive effect of the black. In order to obtain the same effect on projectiles and in mines, only 60 parts of white power will be required for 100 parts of the common kind. The residue of the white being as 31·53 to 68 of the black, it is more cleanly, while the heat generated when it is ignited is much lower ; and a greater number of shots can be fired with it without heating a cannon.

M. Pohl considers that white gunpowder, being more energetic in its action than common black powder, it approaches more nearly gun-cotton for efficiency, and it has the advantage over this substance in being more easily prepared, keeping for a longer period of time without change, and is cheaper. This powder is not only easier of preparation than the old, but it may be made in a few hours in great quantities with very simple machinery. M. Pohl states that it is difficult of explosion by pressure and percussion ; but Mr. F. Hudson, in his communication to the *Chemical News*, states that he made several samples according to M. Pohl's receipts and found that when he mixed the materials moist, then dried them at 150° Fah., the powder was very liable to explode with friction—it was indeed percussion powder. This was not the case when they were mixed dry. He says :—"A cannon loaded with white gunpowder goes off on the application of a few drops of sulphuric acid applied at the touch-hole. The property of this gunpowder may possibly be applied to some advantage in the preparation of bomb shells for long ranges. These shells would not explode until they strike the object, if filled with white powder, and contain a small glass vessel with sulphuric acid. No explosion of the shell would take place in the air, as is too often the case with the ordinary fuse shell."

As this white powder contains a very large amount of the chlorate of potash, it will corrode the locks and barrels of rifles more rapidly than common gunpowder. It, however, may be used as a good substitute, if saltpeter becomes scarce and high in price. It will also require to be handled with more care, as it is liable to explode with severe pressure. We have exploded it easily on an anvil by a blow with a hammer. As it is very cleanly we would prefer it to black powder, and it may yet be so manufactured, we believe, as to become a substitute for it, for most purposes.

A NEW ARTICLE MADE FROM OLD SHOES.

A patent has lately been taken out in England by T. Gee, of Nottingham, for manufacturing a new article to be used for belting, the upper of shoes, and various other purposes for which pure leather has been hitherto employed. He first takes old boots and shoes, old harness, belts &c., cuts them in small pieces, washes them thoroughly in water and reduces them to a soft pulpy condition by soaking. After this he rolls them out between rollers, dries and mixes them with minute quantities of hemp or flax fiber. They are now intimately united together with a strong solution of glue or gutta percha, then rolled out into bands for belts, or pressed into molds for the uppers of shoes, or other articles designed to be manufactured from it. This is designed to be the conversion of what has been considered *waste* substances to useful purposes.

We have seen wrapping paper and several other articles manufactured out of waste leather, but they all lacked strength. The mixing of flax fiber with the leather pulp may impart to it sufficient tenacity to render it strong and durable.

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MORE ABOUT FRICTION MATCHES.

As quite a number of fires in buildings have been caused by the ignition of friction matches, M. Lundstrom, of Jonkoping, in Sweden, in order to insure greater safety, has been manufacturing matches for the past year which can only be ignited by rubbing them upon a peculiarly prepared surface. The splints are tipped with a preparation of chlorate of potash, 6 parts; sulphide of antimony, 3 parts; glue, 1 part. The following is the preparation for the frictional surface on which these matches must be rubbed to ignite: First coat the surface (paper or wood) with a paste composed of glue and emery. When this is dry apply the following: amorphus phosphorus, 10 parts; sulphide of antimony or peroxyd of manganese, 8 parts; glue, 4 parts; made into a paste. This method of making friction matches divides the igniting and oxygenating substances, and renders them less dangerous, but not so convenient. We like the complete match in itself, independent of a frictional phosphorus surface to rub it upon, but in houses where there are children the new matches are certainly more desirable for safety. One pound of phosphorus is sufficient for tipping 1,000,000 matches.

The extent of the match manufacture appears almost fabulous. The total number of matches made in the United States, has been estimated at 7,000 gross of boxes daily. Mr. Partridge, of New York, is said to be the largest manufacturer. His match works, in order to obtain wood conveniently, are situated in the timber region of Lewis County, N. Y. In Herkimer, N. Y., there is also an extensive manufactory of matches and friction patent fire kindlers. There are also several other similar match establishments in various parts of the country.

In London there is one match establishment which makes 33,000,000 matches weekly, but vast quantities are also imported from the continent of Europe into England—Sweden alone furnishing to London 1,500 tuns of them yearly. In Paris 990,000,000 boxes of matches are manufactured annually.

Austria, however, is the greatest country in the world for manufacturing matches. In 1849, 200 tuns of them were exported from the port of Trieste alone.

The use of phosphorus in the match manufacture used to produce a terrible disease in those engaged in dipping the splints. Their teeth were first attacked, then the jaw bone, which rotted away gradually, and no antidote was ever found for it. Many operations have been performed in the New York Hospital for this disease. In some cases the entire jaw bone has been removed, in others part of the bone, the patients generally recovering.

Thorough ventilation of match manufactories, personal cleanliness and the use of amorphus phosphorus instead of common phosphorus, have been the means of decreasing the number of victims to this disease. The friction match is an humble but most convenient representative of modern civilizatien, applied to the useful rather than the ornamental arts. It is found in the palace and the wigwam, and is an indispensable servant of the prince and the peasant.

In the London *Chemical News*, August 30, which has come to hand since the above was penned, Dr. H. Dumbar, in a letter, states that the jaw disease produced by phosphorus is a cancerous ulceration. He recommends those who are exposed to the fumes of this substance to smoke cigarettes which have been dipped in a very weak arsenical solution. It is his opinion that this will prevent them from being attacked with the disease.

NATIONAL RIFLE CLUBS.

We have received a circular containing the rules and regulations of the "Central New York Rifle Club," an association which was formed in 1848, with John R. Chapman, C.E., of Oneida Lake (author of the "American Rifle"), as president; J. D. Owen, of Syracuse, as secretary; and Wm. Malcolm, as treasurer. It is formed upon the basis of the German and Swiss rifle clubs, and some knowledge of its rules and regulations may be of general interest to those who are now taking measures to form such clubs throughout our country.

The object of the Central New York Rifle Club is stated to be "the furtherance of the noble art and science of rifle shooting, both at rest and off-hand, by gathering together once every year the members of said club, for the purpose of competing for such prizes and on such terms as the committee of management may deem prudent. Any person who is an inhabitant of New York State may become a member of this club upon the payment of $5, which is applied to purchase suitable prizes for the annual shooting match, held on New Year's Day.

The rules for conducting the shooting matches permit every candidate for a prize to use a rifle of any construction and mode of sighting suitable to himself. They say "it is not just to cramp the invention and ability of our mechanics and marksmen by arbitrary rules and regulations on these points."

This is a just and enlightened rule. There are several rifle clubs in New York and its vicinity, principally composed of Germans and Swiss, who have annual matches for prizes, but their rules are arbitrary and absurd respecting the sights of rifles, none but "open sights" being permitted. The term "rifle practice at rest" means, by the rifleman's rules, that the muzzle end of the weapon be rested only, the butt plate being held against the shoulder or top arm muscle. The term "rifle practice off-hand" means that the marksman shall stand up, and use nothing except himself and his weapon; but having a perfect right to hip, or rib his elbow, or use off-hand clean, as he pleases.

All matches are decided by a string of shooting of no less than three shots, and all strings are measured from the center of the target to the center of each shot, the aggregate distance being the length of the string. Each string shot is measured, counted and plugged in the target, and every marksman furnishes a target for himself.

The size of the targets are as follows: For twenty rods distant, 12 inches square; thirty rods, 18 inches square; forty rods, 24 inches square; fifty rods, 36 inches square; sixty rods, 48 inches square; and so on, in proportion to the distance.

As a general rule, all accidents and blunders which may befall a marksman in shooting a string, when caused by his own carelessness, are counted against himself; those which may be fairly attributed to his weapon are overlooked. A sufficient number of impartial judges are chosen to settle all questions of difference which may arise, and see that the rules are effectually carried out.

DISCUSSION ON THE PATENT LAWS IN ENGLAND.

Many of the English papers are discussing Sir William Armstrong's remarks in opposition to the protection by law of a man's property in inventions. The London *Engineer* quotes from "an old American tract, written by one Professor Daniel Treadwell," to prove that Armstrong's mode of constructing his cannon was tried on an extensive scale 20 years ago in this country, and the fact was generally known among the gunmakers of England! Professor Treadwell says:—

My observations upon the lodgment have been made upon wrought-iron cannon. Between the years 1841 and 1845 I made upward of twenty cannon of this material. They were all made up of rings or short hollow cylinders, welded together endwise. Each ring was made of bars, wound upon an arbor spirally, like winding a ribbon upon a block, and, being welded and shaped in dies, were joined endwise, when in the furnace and at a welding heat, and afterwards pressed together in a mold by a hydrostatic press of 1,000 tons force. Finding in the early stages of the manufacture that the softness of the wrought-iron was a serious defect, I formed those made afterwards of a lining of steel, the wrought-iron bars being wound upon a previously formed steel ring. Eight of these guns were 6-pounders of the common United States bronze pattern, and eleven were 32-pounders of about 80-inch length of of bore, and 1,800 lbs. weight. Six of the 6-pounders and four of the 32-pounders were made for the United States. They have all been subjected to the most severe tests. One of the 6-pounders has borne 1,560 discharges, beginning with service charges and ending with ten charges of 6 lbs. of powder and seven shot, without essential injury. It required to destroy one of the 32-pounders, a succession of charges ending with 14 lbs. of powder and five shot, although the weight of the gun was but sixty times the weight of the proper shot.

The *Engineer* asks:—

What is the substantial difference of structure between the gun described in Professor Treadwell's pamphlet (a copy of which has been deposited in the library of the Institution of Civil Engineers) and the guns patented in 1855 by Captain Blakely and in 1857 (!) by the then Mr. W. G. Armstrong? Professor Treadwell's description would answer, almost exactly, for that of gun-making at Woolwich; except that, in the Woolwich and Elswick guns, the "steel ring"—at first used for the chase—has been abandoned for wrought iron, apparently for no other reason than to evade, if possible, Captain Blakely's patent.

It seems that Mr. Armstrong, having picked up these old inventions and patented them, and sold the patent to the English government for $100,000, having been knighted for the inventions, and having made immense profits in manufacturing ten millions of dollars worth of his guns for the British army and navy, now that all which is original in his patent is proved by experience to be impracticable and useless, and all that is of any value is the invention of others, suddenly comes to the conclusion that the patent laws ought to be all swept away!

In the discussion which this proposition has drawn forth it is gratifying to see how clearly the English writers perceive that the opposition comes from a few masters of industry who wish to keep their workmen down, while those beneficent laws protect all thinking men, rich and poor, in the fruits of their original ideas, which, more clearly than any other possessions, are their own rightful property.

If our friends over the water attach any importance to our experience in the matter, we can tell them that the propriety of patent laws is thoroughly established in our convictions. We regard them and our common schools as the two great corner stones of our prosperity.

SUBSTANCES THAT WILL CRYSTALLIZE AND THOSE THAT WILL NOT—A NEW SEPARATION.

The eminent chemist T. Graham, Esq., F. R. S., Master of the Mint, recently read a paper before the Royal Society in London, on a new mode of separating substances like sugar and salt, which will crystallize, from those such as gum, which will not. Mr. Graham calls the class that will crystallize *crystalloids*, and those that will not, *colloids*.

The *crystalloids* in solution are free from gumminess or viscosity, and are always sapid or have a positive taste.

The solution of *colloids* has always a certain degree of viscosity, and they are insipid or wholly tasteless. Starch, the vegetable gums, tannin, albumen and vegetable and animal extractive matters belong to the class of colloids.

Mr. Graham finds that these two classes of substances may be separated from each other by the mysterious operation of osmose. He constructs a vessel in the form of a sieve with a flat hoop of gutta perch and a bottom of animal membrane, like bladder, or of the paper called "vegetable parchment," and pours the solution containing the mixture of the crystalloid and colloid into the vessel to the depth of half an inch, and then floats the vessel on the surface of water. The crystalloid passes down through the membrane by osmose, and the colloid remains. Mr. Graham gives to this mode of separation the very appropriate name of *dialysis*.

Great Rifle Guns.

In the Elswick Ordnance Works of Sir William Armstrong & Co., near Newcastle, England, no less than 3,000 men and boys are continually employed. A great 300-pounder battery gun is about to be constructed there for the British government. Its bore will be 10½ inches; length, 14 feet; weight 12 tuns; and is to be a muzzle-loader. A 200-pounder breech-loader is now being manufactured at these works, and from six to eight rifled guns, of various calibers, are turned out weekly.

On the recent occasion of a large invited party visiting these works, Mr. R. Lambert, one of the proprietors, stated that they had fired bolts of 700 lbs. weight from one of their 100-pounder guns without the least appearance of bursting it. He also said:—"A question of great interest had to be solved, viz - whether artillery could be made to break the strongest and heaviest iron plates with which ships could be protected. If he might venture on a prediction as to the solution of this question, it would be that they would manufacture Armstrong guns which no plates that any vessel could carry and float, could have any chance of resisting."

A TERRIBLE steamboat disaster occurred on the 25th ult. on the Sacramento river above the city. The J.A. McClelland, an independent steamer, running to Red Bluff exploded, killing fifteen certainly and probably many more of the passengers. Twelve were scalded, some of whom have since died. Among the victims are Capt. Webster, Z. Gardner, C. S. Howell, Jos. Acceja and Jas. Morrow, of Sacramento.

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CONTINUED AND STEADY PROGRESS OF AMERICAN INVENTIONS IN EUROPE.

There is no doubt that the war in this country, aided by the systematic misrepresentations of its causes and purposes by the London *Times*, the leading paper of Europe, has, to the intense delight of the nobility and privileged classes, given a great check to the progress of our political ideas among the people of the Old World. But there is one class of our ideas —our notions in regard to mechanical operations— that make their way abroad in spite of all obstacles. The great masters of industry are not going to conduct their works with interior implements when better are offered to their use.

Patents for the following American inventions have been recently secured in England through the Scientific American Patent Agency ;—

Belt Shippers.—Patented by John C. Goar, of Jamaica Plains, Mass. An illustrated description of this invention was published on page 384, Vol. III., Scientific American (new series.)

Rotary Engines and Pumps.—Patented by Kenyon and Theodore Cox, of New York city. The aim of this invention is to accomplish that long-sought desideratum, the perfect packing of a rotary engine. Though not complicated it would require drawings to make it intelligible.

Improvements in Knitting Machinery and in the Mode of Operating the Same.—Patented by the McNary Knitting Machine Co. of the city of New York. A complete and ingenious mechanism, and cannot be understood without the aid of diagrams.

Fastening of Window Shutters and Blinds.—Patented by Augustus Reeve, of Allowaystown, N. J. This invention consists in fitting the bolt with a case somewhat wider than the bolt, so as to admit of the latter having two movements, a longitudinal and a rising and falling one, the socket, which receives the end of the bolt, being constructed in a similar way, and provided with an opening in its back plate, which opening forms the orifice of a supplemental socket, to receive the bolt when the shutters are secured in a bowed state.

An Improved Mode of Desiccating Wet or Moist Substances.—Patented by J. Eugène Tourné, of New Orleans, La. This invention relates to an improved chamber for drying wet cotton, and consists essentially in placing a bath of fusible metal in the bottom of the chamber, with an apron to carry the cotton slowly through above the bath.

Preparing Compounds of India Rubber, Gutta Percha &c.—Patented by Rudolph Franz Heinrich Havemann, of New Brunswick, N. J. This invention relates to the compounds of india rubber, gutta percha, and allied gums of a texture and appearance resembling ivory or bone. When the gum has been dissolved and treated with chlorine, nearly all of the solvent is washed out with alcohol, a sufficient portion only being left in to keep the gum in a plastic state. Aqua ammonia is then added, and after grinding or stirring the mass till a thorough mixture is effected, powdered salammoniac and pure lime (oxyd of calcium) in a finely powdered state are added, and thorough incorporation by stirring or grinding is effected. The compound is then placed in a suitable metallic mold, and subjected to a heavy pressure, which is to be increased from time to time until the substance is sufficiently condensed, when it is to be removed from the press and exposed to heat until it becomes perfectly hard ; it will then be compact and white, and of texture and appearance resembling ivory, and will withstand the action of all varieties of climate, of hot or greasy water, and of acids.

Packing Press.—Patented by John Jordan Eckel, of New York. This press was invented by A. Randel, of this city, and was illustrated on page 360, Vol. III., Scientific American (new series.)

Feathering Paddle Wheel.—Patented by Byron Densmore, of Brockport, N. Y. This invention relates to paddle wheels in which a rotating eccentric is used for controlling the operation of the floats.

Spring Hinges.—Patented by George Bowen Pierson, of the city of New York. This invention relates to a mode of increasing or diminishing, and of reversing, and even of neutralizing the action of the springs of hinges, particularly those known as butt hinges.

Improved Pavement for Streets.—Patented by Lucius Stebbins, of the city of New York. A smooth plate of cast iron is supported by ribs a few inches above a lower plate resting upon the ground, and the upper plate is perforated with numerous square holes through which iron pins project upward a short distance. These pins are balanced by springs or weights, so that they will easily yield to the vertical pressure downward of the wheels, but will prevent the horses' feet from slipping sideways. Steam or hot air may be introduced between the plates to melt snow or ice.

Cutting and Rounding Corks and Bungs.—Patented by Alexander Millar, of the city of New York. This admirable invention was illustrated on page 152, Vol. IV., Scientific American (new series.)

Quartering Cork Wood.—Patented by Alexander Millar, of New York City. This invention is by the same ingenious and judicious inventor. It would require engravings to make it intelligible.

Making Paper from Corn Leaves---A Great Discovery.

We translate the following from *L'Invention :*—

The conversion of the fibers of maize into paper is to-day an industrial fact confirmed by extensive success, and this discovery cannot fail to influence considerably the price of paper. This discovery, it is true, is not absolutely new ; in the Eighteenth century the manufacture was in operation in Italy with remarkable success ; but, strange to say, the secret was kept by the inventor, and was lost at his death. Many attempts since made to revive the manufacture have all recoiled before the difficulty of removing from the leaves the silica and resinous matter which they contain, and which obstructs the conversion of pulp into sheets Happily, this secret has just been rediscovered, and not, as would have been anticipated, by a chemist, but by a simple Jewish writing-master—M. Moritz Diamant, an Austrian subject—to whom the new industry is going to give a considerable fortune. His process is applied at the present moment on a very large scale, at the imperial manufacture of Schlogelmühle, near Glonitz, in Lower Austria. Although the machinery of the establishment was constructed for working rags, and is not at all adapted to the kind of preparation that corn leaves require, the essay which has been made has had a prodigious success ; the paper obtained leaves nothing to be desired in strength, homogeniety, polish and whiteness. In the last point, particularly, the sheet from corn surpasses that from rags, which always contain impurities that can be removed only with great difficulty.

It is Count Carl de Lippe Weissenfeld who operates at this moment the discovery of M. Moritz Diamant, interested, as may well be supposed, in the fabrication of paper from maize.

According to the German journal from which we have borrowed the preceding details, the principal advantages of this new manufacture are the following :—

1. It is not solely possible to produce from the leaves of maize all the species of paper manufactured at this day ; but it happens, furthermore, that in several respects this paper is superior to that made from rags.

2. But little starch is required to prepare the paper for receiving writing, which results from the fact that the corn leaves already contain a natural ingredient that takes the place of starch. This ingredient may be easily removed if desired.

3. The bleaching of this paper is effected almost instantaneously by a process the most simple and the most efficacious. It is, furthermore, only feebly colored, and for wrapping paper, the bleaching is entirely unnecessary.

4. The paper from maize is stronger –more tenacious –than the best paper made from rags. There is none of the fragility which characterizes paper into the composition of which ordinary straw enters—a fragility which is principally due to the abundance of silica contained in straw.

5. In the process invented by M. Moritz Diamant, no species of machine being necessary to convert the fibers of maize into paper pulp, and this conversion being made by means entirely different from those employed in working rags, there results a great simplification in the apparatus, and consequently a notable reduction in the manual labor and the expense of the manufacture.

New Green Colors.

The poisonous character of green colors, manufactured from the arsenates of copper, renders them very dangerous and objectionable. The following are new green colors designed as substitutes for arsenical greens, described by Professor Elsner, and published in the London *Chemist and Druggist :*—

Elsner Green.—This is prepared by adding to a solution of sulphate of copper a decoction of fustic, previously clarified by a solution of gelatine ; to this mixture is then added 10 to 11 per cent of protochloride of tin, and lastly, an excess of caustic potash or soda ; the precipitate is then washed and dried, whereupon it assumes a green color, with a tint of blue.

Tin Copper Green.—This is made by heating 59 parts of tin in a Hessian crucible with 200 parts of nitrate of soda, and dissolving the mass when cold in caustic alkali ; when clear, this solution is diluted with water, and a cold solution of sulphuret of copper added ; a reddish-yellow precipitate falls, which, on being washed and dried, becomes a beautiful green.

Titanium Green.—Titaniferous iron is fused in a Hessian crucible, with twelve times its weight of sulphate of potash ; when cold, the fused mass is treated with hydrochloric acid heated to 122° Fah., and filtered hot ; the filtrate is then evaporated until a drop placed on a glass plate solidifies ; it is then allowed to cool, and when cold, a concentrated solution of salammoniac is poured over the mass, which is well stirred and then filtered. The titanic acid which remains behind is digested at 122° or 140° Fah. with dilute hydrochloric acid, and the acid solution, after the addition of some solution of prussiate of potash, is quickly heated to boiling ; a green precipitate falls, which must be washed with water acidulated with hydrochloric acid, and then dried under 212° Fah.; it forms a beautiful dark green powder.

Gold and Platinized Steel---Alloy for Bells.

A patent has lately been taken out in England, by Mr. Wm. Longmaid, for improving the quality of iron and steel by alloying them with a minute quantity of gold, or gold and platinum combined. As gold fuses at a comparatively low temperature, the alloying of it with iron does not appear difficult, but how to alloy platinum with iron is certainly an object of great interest to metallurgists, because platinum is such an infusible metal. With respect to the method of producing this alloy, Mr. Longmaid says:—

The most convenient mode of applying gold or platinum in minute quantities to melted iron or melted steel, is first to cast small ingots of iron or steel, each containing a suitable quantity of gold or platinum, or of both those metals, for alloying a tun or other weight of iron or steel on which it is desired to act at one time. The gold or platinum is introduced into the ingot molds, then the melted iron or steel is run into the ingot molds, and such ingots are introduced into the reverberatory or other furnace or vessel containing the melted iron or steel which is to be improved by the action of gold or platinum, or of both those metals, and it will be found that when these ingots have melted and mixed with the iron or steel, the gold or platinum will be diffused very intimately throughout the whole mass, and the gold or platinum, or both those metals, will consequently act on the whole mass so as to produce the desired beneficial results thereon. Or the gold or platinum may be otherwise introduced into the melted iron or steel ; and in cases where gold is contained in quartz, or other minerals in ascertained proportions, the quartz or minerals may be employed without first separating the gold therefrom, and the same be used in the blast furnace or otherwise. I would state that, with the exception of an alloy of iron for making bells, I have not found it desirable to introduce more than half on ounce of gold or platinum, or of the two metals together, to each tun of iron or steel, though for special cases, it may be hereafter found desirable to exceed these quantities.

In the manufacture of steel bells, the patentee states that he has used as much as three ounces of gold to the tun of steel, by which he obtains a very sonorous metal. We have heard before of gold having been employed for alloying steel, but not platinum. About from one-fourth to one-half of an ounce of gold and platinum added to the tun of cast iron, puddled iron, or puddled steel, is stated to improve their qualities to such a degree that the extra cost for the precious metals will be more than covered by the greatly increased prices that may be obtained for the new and superior alloys.

Manufacture of Cast Steel in a Reverberatory Furnace.—*Le Journal des Mines* gives an account of successful experiments in melting steel for manufacturing cast steel in a common reverberatory furnace, in place of the little crucibles that are ordinarily employed ; thus enabling from 1,000 to 2,000 lbs. to be melted in one mass, permitting the employment of a cheaper fuel, saving the great cost of the crucibles, and effecting a notable saving in the expense of the manufacture. The steel is protected during the process from contact with the air by a covering of melted scoria, and the fire is supplied with a blast of hot air.

Sir David Brewster, in his "Life of Newton," says that neither Pemberton nor Whiston, who received from Newton himself the history of his first ideas of gravity, records the story of the falling apple.

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FOR THE WEEK ENDING SEPTEMBER 10, 1861.

Reported Officially for the Scientific American.

PATENTEES, READ THIS.

The new Patent Laws which went into force on the 2d of March last, authorized the Commissioner of Patents to have all the specifications which form part of the Letters Patent printed.

This is a wise provision, and it renders the documents much handsomer than the old system of engrossing them on parchment; besides, in passing before the printer and proof-reader, the clerical errors, which were often made by the copyist, are mostly obviated, thus rendering the patent more likely to be correct.

But to afford the printer and proof-reader an opportunity to do their work properly, the Patent Office is obliged to withhold the Letters Patent after granting them, for about *four weeks* after the claims are published in the SCIENTIFIC AMERICAN.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

2,224.—J. C. Adams, of Baltimore, Md., for Improvement in Apparatus for Injecting Meat with Brine:

I claim saturating pieces of meat with brine or other preservative liquids under uniform hydrostatic pressure by means of apparatus substantially as specified, for the purpose of rapidly salting or curing the same.

2,225.—H. L. Arnold, of Elk Horn, Wis., for Improvement in Machines for Dressing Hides:

I claim, first, The described arrangement of reciprocating knives, H J, working over an adjustable bed, D, in the manner and for the purpose substantially as set forth.

Second, A knife, J, placed in plate, F, and working through this plate as described, for the purpose set forth.

Third, Placing in front of knife, J, and plate, F, a disconnected independent rubber plate, E, as and for the purposes specified.

Fourth, The manner described of securing the knife, H, to the rubber plate, F, so that it can be adjusted relatively thereto for the purposes set forth.

Fifth, A knife stock, J′, with bearings, prolongations, tongue clamping plate, k′, and bolts, k, for securing and adjusting knife, J, as set forth.

Sixth, The arm, n, with gage screw, n′, stud, o, and set screw, Z, as set forth, for the purpose mentioned.

Seventh, A hand lever, p, rack shaft, p′, and bearings and spring, o′, for elevating bent arm, n, for the purposes mentioned.

Eighth, Keeping the knife plate, F, and rubber plate, F′, snug upon the hide by means of springs, i i i, arranged as set forth.

Ninth, The combination of buffers, g g, sliding rectangle, G′, inclined planes, e e e e, lifting frame, G, studs, d d c c c c, with their nuts, by means of which all the tools are lifted from the hide at the commencement of the return stroke and suffered to fall upon it again at the commencement of the working stroke, substantially as described.

Tenth, The combination of the buffers, g g, with the sliding frame, G′, rack, h2, pinion, h′, shaft, g2, and loaded arm, g′, as set forth.

Eleventh, Placing the bed, D, in front of the saddle-way, B, instead of beneath it, as and for the purpose set forth.

Twelfth, So forming and extending the saddle, C, and its plate, C′, that it may work over bed, D, in the manner set forth.

Thirteenth, Giving motion to the saddle, C, or cutter head of a hide dressing machine by means of a segmental slotted lever, E, as described, whereby a uniform motion of the tool is obtained.

Fourteenth, Hinging the bed, D, of a hide-dressing machine to the frame, A, at one end, and supporting said bed at the opposite end by adjusting screws r′ r′, on bracket, S, as and for the purposes set forth.

[This invention relates to certain new and useful improvements in machinery for depilating, fleshing and preparing hides for the tanning process.]

2,226.—C. G. Anthoni, of Paris, France, for Photographic Apparatus. Patented in England December 10, 1860:

I claim, first, The arrangement of the sensitizing and developing baths within the camera box, and in relation to the camera in such manner that I can sensitize the plate, take the picture and transfer the picture to the developing bath without removing the plate from the dark room formed by the camera and baths, substantially as specified.

Second, The combination of the hooks, k k k′ k′ and k″ k″, the whole applied and operating substantially as and for the purpose specified.

Third, The hooks, q q′, applied and operating substantially as and for the purpose set forth.

2,227.—H. H. Beach, of Philadelphia, Pa., for Improvement in Grain Separators:

I claim, first, The combination of the series of deflectors, D, with the fan, B, and the delivery board, E, when constructed and arranged substantially as described and for the purpose set forth.

Second, The elbows, K, combined with the deflectors, D, and the fan, B, the whole substantially as and for the purposes described.

2,228.—Edwin R. Bigelow, of Salem, Mass., for Improved Clothes Frame:

I claim the construction and arrangement of the standard, A B, the bars or rods, D, with or without the wire, all substantially as shown and set forth, for the purpose described.

2,229.—Earll Bellinger, of Hickory Corners, Michigan, for Improvement in Seeding Machines:

I claim the arrangement of the hinged hoe levers, L, and guides, N, and foot levers, M, with the lever, n, rod, k, pinion, F, box, G, and seat, H, all as shown and described.

[This invention consists in the arrangement of a series of treadles, each connecting with one pair of the cultivator teeth or hoes, in such a manner that the driver is enabled to raise each pair of hoes independently of the rest, and that, if the seeding machine in its progress passes over a stone or root, those hoes, which otherwise would strike said stone or root, can be lifted up without interrupting the correct operation of the rest of the hoes; also, in the arrangement of a curved slot in the end of the seed slide, in combination with a vibrating bell-crank lever, to which motion is imparted by the action of a rotary crank shaft, in such a manner that said seed slide remains stationary at either extremity of its stroke, thus giving time to the seed cells to fill and discharge freely, while, at the same time, the machine progresses at a uniform rate and without interruption; also, in the arrangement of a sliding journal box, in combination with the rotary crank shaft, which imparts motion to the seed slide, and with a hand lever in such a manner that, by imparting to said journal box a sliding motion, the pinion which gives motion to the crank shaft can be thrown in or out of gear at the option of the driver.]

2,230.—H. K. W. Boardman, of Chicago, Ill., for Improvement in Vaginal Syringes:

I claim the contracting and self-expanding syringe ball, D, attached to a hollow shaft, C, passing through the cylinder, A, with the sponge attachment, B.

Also, The sponge attachment, B, to act as a tampon or plug, in connection with the syringe ball, D, and shaft, C, and introduced by means of the cylinder, A, to retain the injection made by means of said syringe, thus to permit, and insure a more perfect and complete effect of and injection so made.

2,231.—Riley Brotton, of Oskaloosa, Iowa, for Improvement in Cultivators:

The expanding toothed frames, G G, constructed substantially as shown, connected to the mounted bar, A, through the medium of the levers, K K, and attached to the elevating levers, J J, by means of rods, e e f g, all combined and arranged for joint operation, as and for the purpose set forth.

[This invention relates to an improved cultivator for cultivating growing crops which are grown in hills or drills. The object of this invention is to obtain a machine by which the work may be rapidly performed, and the parts placed under the complete control of the operator, both as regards the expanding and contracting of the parts to suit the width of the spaces between the rows, and also as regards the casing of the parts so as to free the teeth or shares from the ground in moving or transporting the machine from place to place.]

2,232.—E. R. Chandler, of Cambridgeport, Mass., for Blind Fastener:

I claim the arrangement of the catches, E E E E, and the loops or staples, D D, with respect to the window frame, G, and blinds, B B′, and so as to operate together in manner as set forth.

2,233.—J. H. Coburn, of Lowell, Mass., for Window Sash Fastener:

I claim the peculiar construction of case, E, with its teeth, I, to prevent its turning by penetrating the sash, C, and carrying the catch lever, F, and its spring, L, in operating condition and so that all can be secured to the sash by one screw, substantially as described, in combination with catch, K, secured to the opposite sash and so constructed and arranged with case, E, that the simple act of closing the sashes, locks or fastens them firmly together, and also in the window frame, and also draws the joint rigidly close between the lips of the sash entirely across the window, substantially as described.

I also claim my sash fastener, constructed substantially as described, in combination with the sash, or sashes, substantially as described and shown.

2,234.—Christopher Cory, of Lima, Indiana, for Improvement in Apparatus for Evaporating Saccharine Fluids:

I claim the arrangement of the elevated central partition, D, and gate, F, with the divisions, B C, and partitions, E, as and for the purpose shown and described.

[This invention consists in the arrangement of an elevated partition extending from one side of the pan to the other, in combination with a gate or its equivalent, in such a manner that the circulation of the evaporating fluid can be detained or regulated at pleasure, and that the syrup in its clarified state, and while separated from its scum by continuous active ebullition, can be passed into the finishing part of the pan.]

2,235.—D. C. Cregier, of Chicago, Ill., for Improvement in Hydrants:

I claim, first, the arrangement of the supplementary valve, I, immediately below, and operated in both directions by a positive motion independently of the main valve, B, substantially as and for the purpose described.

Second, The combination and arrangement of the female screw, a, fixed to, or cut in, the portion, A, the valves, B and I, rod, C and C′, corresponding hole, i′, screw thread, i, and removable pin, H, substantially as and for the purpose set forth.

2,236.—A. S. Cross, of Ripon, Wis., for Improvement in Planes:

First, I claim the combination of the arm, 2, provided with slot, 4, with the slot in plate, 1, for the purpose of extending the slot, 3, to form a miter.

Second, The combination of the guide, 7, the arm, 2, the slotted end plates, 1, and the screws, 5 and 6, when the several parts are constructed and arranged in the manner set forth.

2,237.—L. S. Fairchild, of Cleveland, Ohio, and W. B. Sturgess, of Troy, N. Y., for Improvement in Gates and Chutes for Water Wheels:

We claim the circular gate, F, the spiral planes, E, and the chutes, M N O P, when these parts are constructed as described and arranged in their relation to the wheel, R S T, as specified, and operating in the manner and for the purpose set forth.

2,238.—Thomas Fisher, of Camden, N. J., for Portable Manger:

I claim the rods, A B B and C C, hinged to each other and arranged substantially as set forth, in combination with the hoops, d d, or the straps, F and G, or other equivalent appliances, and the bag, D, for the purpose specified.

2,239.—Peter Fraer, of West Springfield, Penn., for Improvement in Cattle Pumps:

I claim the combination of a platform, G, with a spring, N, attached or its equivalent, the pump, B, eduction pipe, C, and trough, F, arranged for joint operation, as and for the purpose set forth.

[The object of this invention is to obtain a simple and economical pump, by which cattle or stock may raise their own supply of water. The invention consists in a novel arrangement of a platform with a pump, eduction pipe and trough, all arranged to effect the desired result.]

2,240.—Joseph A. France, of Cobleskill, N. Y., for an Improvement in Breech-Loading Ordnance:

First, I claim the combination of the yoke, B, with its screw, j, and winch, C, when constructed and operating substantially as set forth.

Second, The combined breech pin and charge chamber when the former is provided with a thick concave head, and the latter has a bore at its mouth larger than the bore of the barrel, as set forth.

Third, The combination with the yoke, B, screw, j, and winch, C, of the combined breech-pin and charge chamber, A, as and for the purpose described.

2,241.—William Frank, of Mount Sterling, Ill., for an Improvement in the Locks of Firearms:

I claim, first, The notched trigger, E, attached to the tumbler, and operating through a slot, i, in connection with a stationary edge, o, substantially as described,

Second, The adjustable piece, G, and the regulator, l, applied in combination with each other and with the notched trigger substantially as described.

Third, The protector, H, constructed, applied and operating in combination with the trigger, E, substantially as specified.

2,242.—Bradley W. Franklin, of New York City, for an provement in Vulcanizing Caoutchouc in Single-Chamber Apparatus:

I claim the mode of vulcanizing india rubber and other gums, as set forth, by the use of an apparatus constituting but one chamber, without fittings or other parts, substantially as set forth and described and for the purpose specified.

2,243.—Florian Grosjean, of New York City, for a Process for Making Iron Spoons:

I claim the process or mode described of making iron spoons by first forming a bar or plate of iron tapered at the edges as described and shown, and afterwards cutting the spoons therefrom in the manner set forth.

2,244.—W. H. Guy, of Jonesville, Mich., for an Improved Chess Press:

I claim, first, The counterbalance lever, K, operating in connection with the stem, I, follower, H, and suspended sash frame, G, to regulate the pressure as explained.

Second, The pivoted blocks, c, employed to support the suspending levers, J, in the manner set forth.

2,245.—W. H. Gwynne, of New York City, for an Improvement in Apparatus for the Manufacture of Water Gas:

I claim the combination and arrangement of the boiler, C, retort, B, carbonizer, D, and reheating pipe, I I, the whole being connected and arranged so that the process of generating the steam and making illuminating gas will be carried on or performed in the manner set forth.

2,246.—Robert Hitchcock, of Watertown, N. Y., for an Improvement in Self-Winding Clocks:

I claim, first, Rendering permanent and equal or preventing excessive inequality in the action of the main spring of a clock, by combining therewith a flutter wheel or its equivalent acted upon by a flue or other similar draft, and operating to wind the spring, as shown and described.

Winding a clock or other time keeper by means of a current of air produced by a pipe, flue or other artificial channel employed for ventilation or otherwise actuating an air motor.

The arrangement of a flutter wheel or wheels made either with movable or immovable vanes, in a tube or its equivalent placed in a wall, flue or other shaft whereby the current or draft thereof, or obtainable therefrom, is made to actuate the wheels of a clock work for the purpose or purposes specified.

In combination with the shaft of a clock-operating spring I claim a flutter wheel constructed as described, having its vanes so connected and hinged to radial spindles on said shaft, as that the said vanes shall be allowed of being opened and closed and be made self-opening by their weight, essentially as shown and described.

The combination for joint operation of fore and aft flutter wheels, the one having movable or opening and closing vanes and the other immovable ones, as described.

Controlling the opening and closing of the movable vanes of a flutter wheel, by the action of the main spring of a clock, substantially as specified.

The combination of devices consisting of the stop or stud on the main-spring barrel the notched wheel gearing at intervals from the former and provided with an inclined plane, the sliding collar on the main-spring arbor and lever, hand and sliding collar, operated thereby or the equivalents of these devices for the purpose described.

2,247.—Ezra P. Hoyt, of New York City, for an Improvement in Securing Carriage Wheels to Axles:

I claim the combination of the right and left hand screw nuts, D and E, made and operating in the manner set forth and described.

2,248.—E. J. Keep and W. H. Briggs, of Stockton, Cal., for an Improvement in Horse-Power Machines:

We claim the combination of the stationary hollow axis and journal, c′, with the the master wheel, C, hub, C2, and shaft, C′, as shown and described.

The construction of the open-toothed wheel, C, with a circular-toothed rim, a, double-beveled flange, a′, vertical flange, f, and radical armed hub, C2, all as shown and described.

[This invention is an improvement in machines for making the labor of horses available in operating thrashing and other machines, where great swiftness of action is desired.]

2,249.—Ezra H. Lewis, of Kingston, N. Y., for an Improvement in Stone Dressing Machines:

I claim the two rotating and sliding shafts, C D, connected as shown, and operated from the driving shaft, B, by means of the square, c, and socket, b; the shafts, C D, being provided respectively with the axes or cutters, G, and the wipers, E E, and the shaft, C, provided with the screw, a, working in the half nut, a*, all combined and arranged to operate as and for the purpose set forth.

[This invention relates, first, to a novel and improved means for feeding the axes over the stone under operation, and, second, to an improvement in the axes, whereby the blades of the same may be adjusted to cut stones with horizontal or inclined planes, as may be required; the whole forming an exceedingly simple and efficient device for the desired purpose.]

2,250.—Siegfried Marcus, of Vienna, Austria, for an Improvement in Relay Magnets. Patented in Saxony Aug. 23, 1860:

I claim constructing the relay magnet of several plates of angle iron substantially in the form set forth.

2,251.—Sylvester Marsh, of West Roxbury, Mass., for an Improvement in Locomotive Engines for Ascending Inclined Planes:

I claim, first, The general arrangement of devices described for driving locomotives on inclined planes of a steep grade, the same consisting of the eccentric, h, attached to the connecting rod of the engine, the pinion, m, and gears, n and n′, in combination with a toothed central rail, as set forth.

Second, I claim, in combination with the central rail, constructed with flanges as described, the traveling friction rollers and the spring plates, arranged in relation to the devices operating them, in the manner and for the purpose set forth.

2,252.—Henry D. Martin, of Ypsilanti, Mich., for an Improvement in Plows:

I claim the combination of the share, A, colter, G, standard, J, flanges, H and I, and revolving mold-board, F, arranged and operating in the manner and for the purposes shown and explained.

2,253.—Seth H. Mead, of St. Andrews, N. Y., for Machines for Separating Gold from Earths, &c.:

I claim, first, The cylinder in combination with an endless screw, as described, the screw to have an increased pitch toward and on the conical part of the cylinder, for the pupose set forth.

Second, I claim making the thread of the screw with an open space next the cylinder for the purpose of facilitating the free circulation of the water above the mercury, as described.

2,254.—C. P. Miller, of Philadelphia, Pa., for an Improvement in Gas Burners:

I claim the plate, b, combined with a gas burner, and arranged on the same, in respect to the flame, as set forth, so that the gas will impinge against one side of the said plate and be spread outward by the latter in a thin sheet, while the opposite side is exposed to the air for the purpose specified.

2,255.—John Miller and Wm. Ketting, of Jersey City, N. J. for an Improvement in Railroad Car Ventilators:

We claim the combination of the reversible drum, B, with the flaps, D D′, when the latter are arranged as shown, to admit when open and by the same ventilator, of the escape of the foul air from the car and the admission of fresh air therein, substantially as described.

[This invention relates to an improved ventilator to be inserted in the upper parts of the sides of railroad cars for the purpose of admitting fresh air and allowing the foul air to escape.]

2,256.—William Moller, of New York City, for an Improved Sugar Cutting Machine:

I claim, first, The arrangement of two rollers running parallel to each other, and provided with circular knives, cutters or saws, placed directly opposite to each other, for the purpose of cutting parallel grooves in both sides of a slab of sugar simultaneously, in the manner and for the purpose described.

Second, I claim the arrangement of the circular turning plate, H, between two sets of rollers provided with circular knives or saws, as described, operating so as to turn the slabs of sugar one-quarter of a circle round, in the manner and for the purpose substantially as described and set forth.

2,257.—William Moller, of New York City, for an Improvement in Apparatuses for Dissolving Crude Sugar:

I claim the arrangement of revolving agitating arms or wheels, in

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a vessel provided with a channel running nearly from top to boitom and covered with a sieve or grating, the whole being combined for the purpose of dissolving raw sugar in cold water, in the manner substantially as described.

2,258.—S. W. Mudge, of Rome, N. Y., for an Improved Churn:

I claim the arrangement of the dasher bar, d, uprights, e e f, recesses, g, and lateral projections, h h, with the double concave ribs and case, A, as and for the purpose shown and described.

[The object of this invention is to effect the liberation of the butter from the sacs or investments of the butter globules in a very expeditious manner, and at the same time without injuring the grain of the butter or in any degree disturbing the globular formation of the butter as it exists in the globule.

2,259.—W. P. Penn, of Belleville, Ill., for an Improvement in Harvesters:

I claim, first, The combination of the jointed frame by which the sickles may be elevated, with the means for counteracting the angularity that would otherwise affect the operation of the sickle, and with a finger bar that may be either flexible or rigid, the whole constructed and arranged in the manner described.

Second, Connecting the finger bar to the frame by means of the hinge joint and the upright, in the manner described, so that the connection with the frame may be made either flexible or rigid, as specified.

2,260.—S. P. Pope, of Burlington, N. Y., for an Improvement in Machines for Trimming Leather:

I claim the combination of the stationary side plate, B, adjustable side plate, B', horizontal plates, C, horizontal set screws, D D', straight-edged knives, F and G, set obliquely, and spring, E, all constructed, arranged and operating in the manner and for the purposes set forth.

2,261.—K. H. C. Preston, of Manlius, N. Y., for an Improvement in Guard Fingers for Harvesters:

I claim, first, The securing of the plate, B, to the face of the guard finger, A, by means of the nipples or pins, e e, cast with the finger, and passing through holes in the plate and headed by means of a punch passed through holes, e e, in the cap, directly over the pins or nipples, substantially as described.

Second, Fitting the guard fingers snugly to the finger bar by means of soft metal bearing surfaces, a*, the latter being run in a molten state into cavities or cups made in the parts, f, and lips, h, of the guard fingers, and secured therein by the headed nipples or pins, g g, substantially as described.

[The object of this invention is to obtain a simple, cheap and efficient means for securing steel plates in the guard fingers of harvesters, —those fingers which are provided with caps. These steel plates form the bearing surfaces for the sickle, and also form leger blades or cutters which greatly assist the cutters of the reciprocating sickles in their cutting operation.]

2,262.—Augustus Reeve, of Allowaystown, N. J., for a Shutter and Blind Bolt:

I claim, first, The employment or use of the plate or flanch, g, placed above the bolt, D, either directly over the recess, e, or situated nearer or further from the end of the plate on which the socket, C, rests, for the purpose of preventing the disengagement or releasing of the bolt from the socket, C, when the lip, a, of the bolt is in the recess, e, when the shutters are in a partially open or bowed state, as set forth.

Second, The employment or use of the button, E, applied or attached to the bolt, D, in combination with the taper plates, d d, attached to the socket, B, in the relation with each other as shown, for the purpose specified.

Third, The employment or use of the recess, e, formed by a semicircular rim on a ledge, f, or extension of the socket, C, under the plate or flanch, g, for the purpose of receiving and securing the lip, a, of the bolt, when it is in a partially open or bowed state, for the purpose specified.

[This invention relates to certain improvements in that class of shutter bolts which are designed for securing the shutters in a partially open or bowed state, as well as for locking them when closed. The object of the invention is to effectually lock the shutters while in a partially open or bowed state, so that they will be equally as secure against burglars as when locked in a closed state.

2,263.—Edward Smith and Sidney Cowles, of Northford, Conn., for an Improvement in Horse Rakes:

We claim, first, The combination of the curved lever, E, roller, F, and arm, G, with the axletree, A, for the purpose of depressing and holding the rake teeth, D, in contact with the surface of the ground, as set forth.

Second, The combination of the bell crank lever, J, with the levers, K and H, pawl, L, and ratchet wheel, I, for the purpose of elevating the rake teeth from the ground and for holding them when so elevated, as described

2,264.—Jasper Snell and J. R. Deihn, of Pottsville, N. Y., for an Improvement in Coal Screens:

We claim, first, The revolving cylinder made of sections or rings, A, with spaces, b, between said rings, operating as set forth, and for the purpose described.

Second, We claim the comb, B, with teeth, c, operating in the continuous spaces, b, between the rings, A, of the revolving cylinder, for the purposes set forth.

2,265.—J. E. Smith, of Poughkeepsie, N. Y., for an Improvement in Electro-magnetic Telegraphs:

I claim a supplementary conductor applied to the local circuit, to operate substantially as and for the purpose specified.

2,266.—N. W. Spaulding, of Sacramento, Cal., for an Improvement in Saws:

I claim the application and use of circular instead of angular lines in setting teeth or other pieces in saw plates and saws, which will prevent the plate or saw from splitting, cracking or breaking at the corners where pressure and force usually apply, thereby distributing the pressure or force equally on the plate instead of it being limited to one spot, as would be the case where angular lines are used, using therefor the saw plate, teeth and other pieces, as described, which will produce the intended effect.

2,267.—J. H. Steadman, of Randolph, Vt., for an Improved Clothes Wringer:

I claim the arrangement of the double-hinged compound levers, the same being connected together by a rod or bar, and operated by an adjustable cross lever and catch acting upon cylinders or rollers, in the manner and for the purposes specified.

2,268.—Abram Van Order, of Ithaca, N. Y., for an Improved Construction of Canal Boats:

I claim the described layers of wood, placed one above the other, making the shell or sides and ends of the boat, the described method of spiking or bolting the said layers together, and the cross rod bracing connecting the bilge timbers with the gunwale timbers, when used in combination with each other; and the just-named combination when further combined with the water stops, lap batting and double dovetailed floor and deck beams, as described.

2,269.—O. O. Van Orman (assignor to himself and H. F. Palmer), of Harrisville, Ohio, for an Improvement in Railroad Car Wheels:

I claim the sleeve, D, in combination with the axle, C, cap, C, chamber, H, and rollers, E, when constructed, arranged and operated as and for the purpose set forth.

2,270.—A. S. Walbridge, of Malone, N. Y., for an Improvement in Cut-off Apparatus for Steam Engines:

I claim the arrangement and combination of the fulcrum wedge, L, levers, D D', and friction bars, E, substantially as specified.

[This invention relates to that kind of cut-off composed of two slide valves riding on the back of a main slide valve. It consists in certain novel means of combining the cut-off valves with the main valve, for the purpose of enabling the movement of the former to close the ports in the latter at various points in the stroke of the engine piston, to be derived from the movement of the main valve itself under the control of a governor or of any device adjustable by the engineer for regulating the engine.]

2,271.—S. R. Warner, of New Haven, Conn., for an Improved Pipe Joint:

I claim the manner described and shown of forming a thin sheet metal pipe joint, to wit: I claim producing the flanges, b and c, by bending and swaging up the metal of the pipes, substantially as and for the purposes described.

[This invention refers to a new and improved method of making joints on thin sheet metal pipe, and more particularly on tin pipes which is employed for conducting the waste or exhaust steam from engines through buildings for warming purposes.]

2,272.—Albert H. Wright, of New York City, for an Improvement in Rice-Cleaning Machines:

I claim, first, Combining with the horizontal cylinder, A, containing the revolving screw, D, the slightly inclined or upright conduit branch pipe or cylinder, E, and surrounding telescopic sliding cylinder, G, for increasing and diminishing its length, and to which is attached the inclined trough, I, leading to the hopper, B, said conduit branch being secured at its lower curved end to the said cylinder, A, in such a manner as to form a continuation of the same, substantially in the manner and for the purpose fully set forth.

Second, I also claim dividing the hopper, B, into two compartments, B' B2, having a slide, S, at the bottom of each, and employing in connection therewith, the movable trough, I, for enabling the given quantity of rice introduced into one of the said compartments, to remain at rest, immediately after passing through the cylinders, A E G, sufficiently long to cool, as before described.

2,273.—Albert Bridges, of New York City, Assignor to himself and Alfred Bridges, of Newton, Mass, for an Improvement in Springs:

I claim the novel bearing spring described as a new article of manufacture, the same being composed of detachable strips, wires, rods or any other form of springs, E, arranged in a circular or polygonal series uniformly distributed around a central quide or slide, A', so as to expand equally in all directions by the bending of the same, and each being so nearly straight when the spring is unloaded that the resistance of the spring to compression shall increase but slightly as the load is increased; the entire structure possessing the qualities and advantages set forth.

I also claim the mounting of a rubber spring, G, within a circular or polygonal series of metallic springs, E, so as to act in combination therewith and to contribute to the tension and modify the range of the spring substantially in the manner specified.

2,274.—Riley Burditt, of Brattleboro, Vt., Assignor to Jacob Esty and Hastel P. Green, of the same place, for an Improvement in Melodeons:

I claim, first, The placing the socket-board for the sub-bass notes in the rear of the bellows and in a vertical position.

Second, Applying the valves of the sub-bass notes to the upper edge of the socket-board so that each valve stops a socket at the upper orifice thereof.

Third, Elongating the keys by extension rods to reach the sub-bass sockets as above specified.

Fourth, Fastening the extension rods to the keys by means of screws and dowels; the whole combined and operating in the manner and for the purpose specified.

2,275.—Isaac I. Cole, of New York City, Assignor to S. B. Wilson, of the same place, for an Improved Machine for Cutting Veneers:

I claim operating the cutter block by the eccentric adjustment, L L M M N N, in combination with the two-fold feed motions of the bolt, H, in the manner described.

[This invention relates to an improved machine for cutting veneers; of that class in which a vibrating bolt frame is used in combination with a stationary cutter or knife.]

2,276.—Rusel Hazard, of New London, Ohio, Assignor to himself and Alexander Porter, of the same place, for an Improvement in Hames:

I claim the combination of the perforated face plates, A', tongued clasps, B b, and oblique loops, B', all constructed, arranged and employed in the manner and for the purpose shown and explained.

2,277.—Lewis Jennings, of New York City, Assignor to himself, R. Dickinson and Jos. C. Fuller, of the same place, for an Improved Filtering Cup:

I claim applying a filter to or near the bottom of any ordinary drinking cup and attaching a tube to the cup and filter in such a way that the act of drinking through the tube shall effect the filtering of the liquid substantially as described.

2,278.—Geo. H. Rogers, of Baltimore, Md., Assignor to himself and John Rogers, of the same place, for an Improvement in Hydrants:

I claim the combination of the valve spindle, C, and guide-tube, D, the spring, F, and the flanged ring, E, with the casing, A, when the whole are constructed and arranged as described for the purpose set forth.

2,279.—Coleman Sellers, of Philadelphia, Pa., Assignor to Wm. Sellers & Co., of the same place, for an Improvement in the Mode of Transmitting Motion:

I claim, first, The use of clamping wheels or their equivalents to transmit motion when said wheels are so arranged as to produce the necessary pressure upon the driving surfaces by a movement at right angles to their plane of motion, substantially in the manner and for the purpose specified.

Second, The use of clamping wheels or their equivalents when they are so arranged that the relative position of the axis of one or more of such wheels may be changed so as to produce a change of velocity, substantially in the manner specified.

2,280.—Julius Wright, of Bristol, Conn., Assignor to himself and Joseph Sigourney, of the same place, for a Whirling Jack for Spinning Tops:

I claim the spindle, c, spring, h, ratchet, d, and pawl, e, combined substantially as and for the purpose described.

I claim the whirling spindle, c, in combination with a toy stem, j, substantially as and for the purpose described.

RE-ISSUE.

122.—Robert J. Marcher, of New York City, Assignee of I. S. Barber, of Boston, Mass., for an Improvement in Machines for Cutting Irregular Forms. Patented May 15, 1855.

I claim the combination of a table or equivalent for rotating the frame to be cut, substantially as described, a pattern of the general form of the frame to be made, and two rotating shafts, each carrying a suitable tracer and cutters, one of the said shafts being self-adapting to the outer, and the other to the inner pheriphery of pattern, substantially as described.

I also claim the employment of two sets of cutters on parallel shafts so mounted that the distance between the two shafts shall be self-adapting, substantially as and for the purpose specified, in combination with a pattern and tracers, or equivalent means for determining the oval or other general form, as set forth.

And I also claim as the invention of the said Ira S. Barber, arranging two cutter and tracer shafts on opposite sides of the axis of the rough frame and one on the outside, and the other on the inside of such frame, substantially as and for the purpose specified.

A CURIOUS circumstance connected with the construction of the great wall of China is narrated by Capt. Parish, who accompanied Lord Macartney to China. It seems to show that 2,000 years ago the Chinese used wall guns, or some firearms of that kind. Speaking of embrasures in the great wall, which was built about 221 B. C., he observes:—The soles of the embrasures were pierced with small holes, similar to those used in Europe for the reception of swivels of wall pieces. The holes appear to be part of the original construction of the wall, and it seems difficult to assign to them any other purpose.

RECENT AMERICAN INVENTIONS.

Gun Lock.—This invention, patented by William Franks, of Mount Sterling, Ill., consists in a certain mode of applying the trigger to constitute what is known as a secret trigger. It also consists in certain devices applied in combination with the so-applied trigger to make it also constitute a hair trigger. And it further consists in a certain mode of applying a protector, in combination with the so-applied trigger, to prevent the accidental cocking of the lock.

Photographic Apparatus.—This invention, by C. G. Anthoni, of Paris, France, consists in a certain mode of applying the sensitizing and developing baths in combination with the camera, and in certain mechanism capable of being controlled outside of the apparatus, making, for operating upon damp collodion in the open air, or in any other place, a complete photographic apparatus, in which the plate can be sensitized, the picture taken and the plate transferred to the developing bath without removing the plate from the dark room formed by the camera and baths.

Improvement in Telegraphs.—This invention relates to all electro-magnetic telegraphs in which a local circuit is used. Its object is to prevent the magneto-electric current induced in the local circuit from darting through the air between the relay points and thereby disrupting the metal from the said points and transferring particles of it from one point to the other, and thus, by forming a flexible conductor between the said points, keeping the local circuit close after the main circuit has been opened. The invention consists in the application to the local circuit of a supplementary conductor, composed wholly, or in part, of some substances of feeble conducting power, as water, through which but a very small portion of the local battery current will pass when the local circuit is closed, but through which the induced magneto-electric current will pass, rather than dart through the air between the relay points when the said circuit is open, said conductor touching the local circuit in two places, one of which may be anywhere between one of the opening and closing points of the relay and the register or sounder magnet, and the other between the other of the said points and the other side of the said magnet. By the use of this conductor a less movement of the armature of the relay magnet may be made effective, the armature may be brought closer to the poles of the magnet, and a finer adjustment of the armature and a weaker armature spring may be used, and the line may be made to work with a weaker main battery, or work better with a main battery of a given strength. J. E. Smith, of Poughkeepsie, N. Y., is the inventor.

Apparatus for Curing Meat.—This invention relates to an improved means for injecting brine into meat, and is designed to supersede the ordinary syringe or force pump used for the purpose. The invention consists in the employment or use of a brine reservoir in connection with a tube provided with a nozzle and stopper, whereby the brine, without any waste or loss, is injected into the meat by hydrostatic or hydraulic pressure, and the work performed with the greatest facility. This apparatus has been patented by J. C. Adams, of Baltimore, Md.

DAVID AGNEW, of Boston, a submarine diver, lately went down near Seal Island to a depth of 150 feet, in search of a schooner called the *Neptune's Bride*, which foundered there about one year ago. This is the greatest depth to which a diver in armor has yet descended. He found the schooner in pieces.

A JOINT company, with a capital of $150,000, has lately been organized in England for the purpose of manufacturing and introducing Boydell's traction steam engines for common roads. Several of these engines have been ordered by the British government for India, to be used in drawing heavy loads.

AMONG recent shipments from Boston, there were 383 barrels of shoe pegs for Liverpool. It has been stated that shoe pegs were invented in 1818, by Jos. Walker, of Hopkinton, Mass. Large quantities of such pegs are now sent to Germany, where they are much used in the manufacture of children's toys.

AT the Watertown, Mass., arsenal about 100,000 cartridges are made daily, also a new kind of rocket, under the supervision of an officer who has been engaged in the Austrian service.

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Notes and Queries

J. B. L., of Pa.—In reference to your mode of plating ships shotproof, we advise you to lay the matter before the government by letter addressed to the Secretary of the Navy. It is important that improvements of this kind, if they forebode good to the public service, should be adopted, and that speedily. We want the best means at command to bring this war to a speedy end.

J. A., of Pa.—If you have made an improvement on another man's patent, he cannot use your improvement after you have secured a patent upon it without liability to you for damages. Send us your model, and state particularly what you desire to claim as your improvement.

L. D. C., of Mich.—As soon as you can get your model ready, forward it to us, together with the first installment of the patent fee ($15), and we will prepare your case at once. If you have made up your mind to apply for a patent, do not delay longer than you can help. Inventors oftentimes suffer much from unnecessary delays.

Miss R. S., of N. Y.—We profess no skill in the art of promoting beauty, but we have heard it said that a good article to remove sunburn and tan is made by taking a handful of bran, pouring a quart of boiling water upon it, letting it stand an hour, and then strain. When cold, put it in a pint of bay rum, and wash the face with it two or three times every day. It will do no harm.

A. R., of Mass.—The public debt of the United States consists of loans amounting to $70,217,048.50, and Treasury notes to the amount of $55,950,500.00. These sums, including the interest, amount to $135,900,762.24. The debt will be largely increased by the immense war expenditure, amounting to $1,000,000 per day.

J. M. S., of Cal.—A patent was issued March 9, 1858, to Charles Raymond, of Bristol, Conn., for an improvement in sewing machines. We have never heard of any litigation growing out of this patent, and do not know who owns it at this time. A patent is considered good until the courts pronounce it invalid.

J. A. S., of Maine.—You are advised to send on a fee of $5, and have a preliminary examination made at the Patent Office, in reference to the merits of your apple-parer. A great many patents have been granted for improvements in this class of inventions.

L. R., of Pa.—Considerable attention has been bestowed upon inventions to print addresses on newspapers, and several patents for such machines have been granted. Messrs. R. W. & D. Davis, of Elmira, N. Y., have such machines in successful operation in this city. We do not call to mind the fact that any reward was ever offered for a machine for this purpose. We think you are mistaken in reference to it.

E. P. D., of N. Y.—The American Institute has not yet announced a fair to be held this fall. Last season the Institute devoted itself to a horticultural show, and in view of the times it is not at all likely that a mechanical exhibition will take place this year.

O. C. S., of N. Y.—Postage stamps are manufactured in this city by Nesbit & Co.

J. H., of Ohio.—Valve motions have been proposed for locomotives with a single eccentric. We cannot tell whether yours is new and patentable without a sketch and description of it.

Wm. M. M., of Ill.—Wm. Cabble, corner of Fulton and Cliff streets, this city, manufactures pure copper wire from Lake Superior copper. Prescott's work on the electric telegraph describes induction coils, magnets, magneto-electric machines, &c., and is the kind of work you want. It is published by Ticknor & Fields, Boston, Mass.

E. F. W., of Pa.—It is not enough for us to know what your improvement in cannons is capable of doing; we must know what it is to enable us to pass an intelligent judgment upon it. Send us a sketch and description of your plan, and we will give you an opinion in regard to its probable novelty.

J. W., of N. Y.—Iron plates placed edgewise on the sides of war vessels would present too many seams. The greatest difficulty connected with the building of iron-clad vessels is the manufacture of suitable plates. Only one firm in England, it is stated, has yet succeeded in making plates of sufficient toughness to come up to the requisitions of the naval authorities.

G. Q. J., of Mass.—Miller's "Chemistry" is a British publication. Muspratt's "Chemistry" is a good work, and is published by Russell & Brother, No. 12 Tremont street, Boston, Mass. Ure's "Dictionary of Arts" contains as much information respecting the manufacture of varnishes as any other work with which we are acquainted.

A. F. O., of N. Y.—So far as we have been able to ascertain, most of the glass used for making achromatic glasses and microscopes is obtained from Europe.

W. E. B., of R. I.—There are several instruments used by military officers and others for measuring distances by sight. They are not only "very useful," as you suggest, but necessary in the present state of military science. The instrument which you have constructed may contain some improvement of a patentable character, but a patent cannot be obtained now for the mere application of an instrument for such purposes.

F. P., of Pa.—We do not know the exact number of arms at present in the hands of the Federal forces, but Gen. Cameron, Secretary of War, stated in his report to Congress in July that over 300,000 stand had been distributed, and as near as we can judge the product of new arms in the private and national armories must amount to from 3,000 to 5,000 daily.

J. J. D., of Me.—Turpentine and naphtha will dissolve gutta-percha and india-rubber, converting these substances into cement for the soles of boots and shoes. Cut the gutta-percha into shreds, place it in the naphtha, and stir it frequently until it is dissolved.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Sept. 18, 1861:—

T. R. T., of Mass., $80; W. A. F., of Pa., $15; G. K. W., of N. Y., $15; J. S. S., of N. Y., $15; S. B., of Conn., $15; J. M. C., of R. I. $30; J. C., of Conn., $15; H. W., of Vt., $15; G. & H., of Mass., $15; R. P. P., of N. Y., $60; J. H. B., of N. J., $20; T. & R., of Mass., $20; F. & L., of N. Y., $25; H. W. W., of Cal., $10; A. B. P., of Cal., $20; R. & T., of N. Y., $100; W. M. M., of Ill., $15; A. K. T., of Mich., $55; J. P. D., of Iowa, $15; A. S. D., of Mass., $15; E. A. W., of Cal., $25; P. S. F., of N. J., $15; J. H., of Maine, $15; W. B., Jr., of N. Y., $47; T. F., of Mass., $20; G. H., of Maine, $20; G. & W. H., of N. Y., $45; C. B., of N. Y., $25; L. M. D., of N. H., $25; W. H. D., of Cal., $20; P. & K., of N. Y., $15; S. & P., of Conn., $30; O. A. A. R., of N. Y., $15; E. W., of Conn., $15; G. O. T., of Mass., $15; A. H. W., of Vt., $15; F. B. S., of N. J., $450; I. F. B., of Conn., $10; J. K. G., Jr., of L. I., $20; C. F. B., of R. I., $20; P. C., of N. Y., $20; P. D. Van H., of N. Y., $20; B. S. C., of N. Y., $30; D. B. A., of N. Y., $25.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Sept. 11 to Wednesday, Sept. 18, 1861:—

C. B., of N. Y.; T. R. T., of Mass., two cases; J. A. G., of Conn.; S. and P., of Conn.; M. and B., of N. Y.; A. and B., of Cal.; E. F. and J. H., of N. Y.; H. W. W., of Cal.; L. M. D., of N. H.; D. B. A., of N. Y.; F. and L., of N. Y.; G and W. H., of N. Y.; B. S. C., of N. Y.; R. P. P., of N. Y.; C. C. and W., of R. I.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

BACK NUMBERS AND VOLUMES OF THE SCIENTIFIC AMERICAN.—Volumes I., II. and III. (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1.50 per volume. by mail, $2—which includes postage. Price in sheets, $1. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding.

BINDING.—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express or delivered at the office, 40 cents.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

RATES OF ADVERTISING.

Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

INSTRUCTIONS ABOUT EUROPEAN PATENTS.

With a Synopsis of the Patent Laws of some of the Countries.

AMERICAN INVENTORS SHOULD BEAR IN MIND that, as a general rule, any invention which is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Four patents—American, English, French and Belgian—will secure an inventor exclusive monopoly to his discovery among 100,000,000 of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the Scientific American Patent Agency. We have established agencies at all the principal European seats of government, and obtain patents in Great Britain, France, Belgium, Prussia, Austria, Spain, &c., with promptness and dispatch.

It is generally much better to apply for foreign patents simultaneously with the application here; or, if this cannot be conveniently done, as little time as possible should be lost after the patent is issued, as the laws in some foreign countries allow patents to any one who first makes the application, and in this way many inventors are deprived of valid patents for their own inventions.

Many valuable inventions are yearly introduced into Europe from the United State, by parties ever on the alert to pick up whatever they can lay their hands upon which may seem useful.

Models are not required in any European country, but the utmost care and experience is necessary in the preparation of each case.

GREAT BRITAIN.

Patents for inventions under the new law, as amended by the act of Oct. 1, 1852, and now in operation, include the United Kingdom of Great Britain and Ireland in one grant, which confers the exclusive right to make, use, exercise or vend. This is conceded to the inventor, or the introducer, for a period of fourteen years, subject, after the patent is granted, and the first expenses paid, to a government tax twice during its existence—once within three years, and once again within seven. The purchaser of a patent would assume the payment of these taxes.

There is no provision in the English law requiring that a patented invention shall be introduced into public use within any specified limit. Under the Patent Act of October, 1852, the British government relinquished its right to grant patents for any of its colonies, each colony being permitted to regulate its own patent system. If a patent has been previously taken out in a foreign country, the British patent will expire with it.

FRANCE.

Patents in France are granted for a term of fifteen years, unless the invention has been previously secured by patent in some other country; in such case, it must take date and expire with the previous patent. After the patent is issued, the French government requires the payment of a small tax each year so long as the patent is kept alive, and two years' time is given to put the invention patented into practice.

It should be borne in mind that, although the French law does not require that the applicant should make oath to his papers, yet if a patent should be obtained by any other person than the inventor, upon proof being adduced to this effect before the proper tribunal, the patent would be declared illegal.

BELGIUM.

Patents in Belgium are granted for twenty years, or if previously patented in another country, they expire with the date thereof. The working of the invention must take place within one year from date of patent; but an extension for an additional year may be obtained on application to the proper authorities. Inventors are only legally entitled to take out patents.

RUSSIA.

Since the close of the Crimean war, considerable attention has been given to Russian patents by Americans. Russia is a country rich in mineral and agricultural products, and there seems to be a field open for certain kinds of improvements. The present Emperor is very liberally disposed toward inventors, and as an evidence of the interest which he takes in the progress of mechanic arts, we may state that we have had visits from two distinguished Russian *savans*, specially sent out by the Emperor to examine American inventions. As Russian patents are expensive, and somewhat difficult to obtain, we do not take it upon ourselves to advise applications; inventors must judge for themselves; and this remark applies not only to Russia, but to all other foreign countries.

PRUSSIA.

Applications for patents in Prussia are examined by the Royal Polytechnic Commission, and unless there is novelty in the invention, the applicant's petition will be denied; and if it is granted, the invention must be worked within six months afterward. A respite, however, of six additional months may be obtained, if good and sufficient reasons for it can be shown.

CANADA.

Patents of invention are granted only to actual residents of Canada and British subjects. Under the general Patent Law of Canada, an American cannot procure a patent for his invention there. The only way in which he can do so is by virtue of a special act of Parliament, which is very difficult, uncertain, and expensive to obtain. Several zealous friends of reform in Canada are working earnestly to bring about a reciprocal law, but their efforts have thus far proved fruitless.

In addition to the countries above specified, we are prepared to solicit patents in Austria, Prussia, Saxony, Hanover, Norway, Sweden, Australia, British East Indies and all other foreign countries on the most reasonable terms.

GENERAL REMARKS.

While it is true of most of the European countries herein specified, that the system of examination is not so rigid as that practiced in this country, yet it is vastly important that inventors should have their papers prepared only by the most competent solicitors, in order that they may stand the test of a searching legal examination; as it is a common practice when a patentee finds a purchaser for his invention for the latter to cause such examination to be made before he will accept the title.

It is also very unsafe to entrust a useful invention to any other than a solicitor of known integrity and ability. Inventors should beware of speculators, whether in the guise of patent agents or patent brokers, as they cannot ordinarily be trusted with valuable inventions.

Messrs. MUNN & CO. have been established *fifteen years* as American and Foreign Patent Attorneys and publishers of the SCIENTIFIC AMERICAN, and during this time they have been entrusted with some of the most important inventions of the age; and it is a matter of pardonable pride in them to state that not a single case can be adduced in which they have ever betrayed the important trust committed to their care. Their agents in London, Paris, and other Continental cities, are among the oldest and most reliable Patent Solicitors in Europe, and they will have no connection with any other.

CAUTION.—It has become a somewhat common practice for agents located in England to send out circulars soliciting the patronage of American inventors. We caution the latter against heeding such applications, or they may otherwise fall into the hands of irresponsible parties, and thus be defrauded of their rights. It is much safer for inventors to entrust their cases to the care of a competent, reliable agent at home.

Parties desiring to procure patents in Europe can correspond with the undersigned, and obtain all the necessary advice and information respecting the expenses of obtaining foreign patents.

All letters should be addressed to Messrs. MUNN & CO., No. 37 Park-row New York.

CHANGE IN THE PATENT LAWS.

PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 4th of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publica

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ion of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured hrough this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Testimonials.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the acts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

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THE Graefenberg Company wish it to be distinctly understood that their theory and practice is not based upon infallibility. What is claimed, and what is borne out by facts, is that the medicines are the result of the highest medical skill adapted to the compounding of simple and entirely vegetable medicinal preparations. The treatment is the most judicious application of these simple vegetable productions in aid of the great and equally simple laws of nature governing the human system in health and disease. In ninety-nine cases out of a hundred the Graefenberg treatment will certainly cure.

CONSULATE OF THE U. S. OF AMERICA, BOMBAY, Sept., 1860.
This is to certify that I am personally acquainted with J. F. Bridge, M. D., of the city of New York, and that he is a learned and skillful physician of high standing; and further, that I have used the Graefenberg Medicines according to directions given in the Graefenberg Manual of Health, for several years, to my entire satisfaction; and I can confidently recommend them to all who wish to save doctors' bills and enjoy good health.

L. H. HATFIELD,
American Consul, Bombay.

THE Graefenberg Institute combines the sale of medicine, medical advice, and the reception of patients for treatment in the Institute Buildings, No. 2 Bond Street, N. Y. Many of the leading public men in the country have spoken in the highest terms of the Graefenberg Institution and its theory and practice. Others who are unacquainted with the medicines, but who are aware of the integrity and truthfulness of the Resident Physician, have permitted him to refer to them for the truth of what he may say. Among these last we have noticed the names of Horace Greeley, of the *Tribune;* Prof. M. P. Jewett, of the Vassar Female College, Poughkeepsie; the Rev. E. H. Chapin, D.D., of New York; Prof. A. P. Peabody, of Harvard University, &c.

WE, the undersigned citizens of the town of Persia, Cattaraugus County, N. Y., and the town of Collins, Erie County, N. Y., most cheerfully certify that we and our families have used the Graefenberg Family Medicines, and especially the Graefenberg Vegetable Pills, with the most gratifying results. We believe they justly merit the good qualities claimed for them by the Graefenberg Company, and would confidently recommend them to the public.

Signed by Geo. S. Hicker; Thomas J. Parker, physician; Abraham Sucker, farmer; I. P. Rollen, farmer; John Havens, merchant; Ely Page, farmer; Stephen Hooker, farmer; E. J. Goss, drover; G. F. Southwick, farmer; P. Walden, farmer; Wm. Griffiths, butcher; D. Grannis, wheelwright; Edwin P. Daily, builder; H. N. Hooker, merchant, John Barnheart, farmer; E. Van Dorke, cordwainer.

Sworn to before John B. Wilbor, Justice of Peace.

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And I further testify that full credit and faith are due and ought to be given to said certificates.

In testimony whereof, I have subscribed my name, and caused the Great Seal of the State to be affixed hereunto.

Done at the city of Richmond, the twenty-second day of November, in the year of our Lord one thousand eight hundred and forty-eight, and of the Commonwealth the seventy-third.

WILLIAM SMITH, Governor.

By the Governor, Wm. H. Richardson, Sec. Com. and Keeper of the Seal.

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THE UNITED STATES TREASURY NOTES.

The accompanying engraving is a representation of one of the new Treasury notes, and is as nearly a *fac simile* as it is possible to produce of a fine steel engraving by a wood cut. The slips across the right end are the coupons or interest scrip, and are to be cut off and presented at any of the Sub-Treasury offices when the interest is paid. It will be seen that there are five of them, the sixth and last being paid with the principal on the presentation of the note. Coupon is a French word, coming originally from the verb *couper*, to cut, and meaning a piece cut off. The notes are made with the coupons attached, but we have to place them below in order to get the engraving upon our page. The notes are engraved by the American Bank Note Company, of whose establishment and operations we gave a description on page 179 of our current volume. There are five denominations of notes issued, $50, $100, $500, $1,000 and $5,000. Agents have been appointed by government in all the large cities and in the principal towns to receive subscriptions, and the loan is being taken with an eagerness which might have been anticipated from the high interest and perfect security offered. In this city alone, the subscriptions are more than sufficient for the demands of the government, and the accounts from all parts of the country show that there is to be no want of funds to carry on the war.

The London *Times*, that has been laboring so earnestly to dissuade English capitalists from subscribing to this loan, will soon be quoting the notes at a high premium in the London market, if we are not greatly mistaken.

FAC-SIMILE OF THE NEW TREASURY NOTES.

ACT OF 17th JULY 1861.
Washington
August 19th 1861.
THREE YEARS
AFTER DATE
United States
ONE HUNDRED
Promise to pay
Dollars to the order
of Mr George C. Bennett with
7 3/10 per cent Interest payable semi-annually
A. H. Jocelyn
For the Register of the Treasury.
S. B. Stearns.
For the Treasurer of the United States.
American Bank Note Co New York.
100
INTEREST TWO CENTS PER DAY
COUPONS ATTACHED, LAST 6 MONTHS INTEREST
CONVERTIBLE INTO 20 YEAR 6 PER CENT U.S. BONDS

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3 65/100

The Progress of High Pressure Steam in England.

The London *Engineer* says :—Another steamer, the *Sicilia*, leaves the London Docks, this week for the Mediterranean, with 130 lbs. of steam under her safety valves, equal to a fair locomotive pressure. And from all we know of steam boilers and the causes of explosions we judge that the crew and passengers are as little likely to be blown up as her Majesty would be in her state cabin in the royal yacht. In the *Sicilia*, which is, we learn, the ninth vessel fitted with Rowan's engines and boilers, this comparatively high pressure is not carried, as the same or greater pressures are maintained on the boats running on the Western rivers of America, for the sole purpose of diminishing the bulk and weight of machinery, but advantage is taken of it to work expansively to a much higher rate than is attained on any other class of steam vessels in the world. For a pair of 110-horse engines, the steam is admitted at full pressure to a pair of 12½-inch cylinders, to which it is cut off at from one-half to three-quarters stroke, and exhausted thence into four 25-inch cylinders, all the pistons having a stroke of 25 inches. The whole ratio of expansion is, therefore, from twelve to eighteenfold, or, on an average, fifteenfold. With this expansion the steam is, of course, condensed, a surface condenser being employed in which a constant vacuum of upwards of 28 inches is maintained. As the cylinders are small, and the high-pressure cylinders steam jacketed, the loss by condensation in the cylinders should be slight. Taking, therefore, an evaporation of 9 lbs. of distilled water, from a temperature of 100° per pound of coal, such engines ought, theoretically, to work with less than 1½ lbs. coal, per indicated horse-power per hour. And, by actual trial, from 1.36 lbs. to 1.42 lbs. coal only are consumed, a result which is not less conclusive as to the merits of the system than confirmatory of our theoretical knowledge of the properties of steam.

YEAST.—A correspondent writing from the camp mentions the fact, that one of the chief bakers of the Thirty-fourth regiment was formerly the baker of Lord Lyons. He makes his yeast from hops and water alone, and no better, sweeter or lighter bread was ever tasted. Talking of yeast, he tells of a simple recipe for making the same, which is highly commended by the general of one of the brigades. It may be of service to many a poor camp baker as well as tidy housewife:—Boil one pound of flour, quarter of a pound of brown sugar and a little salt in two gallons of water for one hour. When milk warm bottle and cork it close. It will be ready for use in twenty-four hours.

THE Auburn (N. Y.) *Daily Advertiser* states that a mill dam near that city, which had been put up in 1797, was lately taken down, and the timbers, which had been sunk in the mud were found to be perfectly sound.

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